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FIRST ANNUAL REPORT

OF THE

MASSACHUSETTS

STATE DEPARTMENT OF AGRICULTURE

REPORT OF COMMISSIONER AND OTHER OFFICERS

1918

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WILFRID WHEELER of Concord.

Associate Members appointed by the Governor and Council.

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Organization of the Department.

President,	JOHN BURSLEY of Barnstable.
Vice-President,	FRED F. WALKER of Burlington.
Secretary,	R. EDWARDS ANNIN, JR., of Concord.
General Dairy Agent,	P. M. HARWOOD of Worcester.
State Nursery Inspector,	R. HAROLD ALLEN of Fall River.
State Ornithologist,	EDWARD HOWE FORBUSH of Westborough.

Specialists.

Chemist,	J. B. LINDSEY of Amherst.
Entomologist,	H. T. FERNALD of Amherst.
Botanist,	A. VINCENT OSMUN of Amherst.
Pomologist,	F. C. SEARS of Amherst.
Veterinarian,	JAMES B. PAIGE of Amherst.
Engineer,	WILLIAM WHEELER of Concord.
Agricultural Club Work,	GEORGE L. FARLEY of Amherst.

The Commonwealth of Massachusetts.

First Annual Report of the Massachusetts State Department of Agriculture.

Report of the Commissioner for the Year 1918.

To the Senate and House of Representatives of the Commonwealth of Massachusetts.

If the question were asked as to the most important point outstanding in the agriculture of the world during the past year, the general opinion would probably be expressed in one very short word, namely, "labor," while a very close second would be "transportation," the latter being responsible for a situation which has made starvation in some parts of the world, while in other sections food has been so abundant that it has been impossible to sell it. These two very important questions to a great degree determine the feeding of the world, although far too often the question of the food supply is expressed in production. Production is impossible without labor. Supply is impossible without transportation. From a world-wide standpoint agriculture has rather settled itself around the question of transportation, although production has been stimulated to a large degree in sections where it was possible to utilize the products. The great countries have practically had to adopt systems of rationing their people, not so much because of a world-wide shortage of food, but largely because this food could not be brought to them. In some cases where a country has been very largely non-productive this country has had to become as near self-supporting as possible. England is a good example of this, having increased her food production from 20 to 80 per cent of her needs.

The time seems to have come when the nations of the world will consider their future as much from the angle of food supply as from any other point.

The determination of a nation's success, either in peace or war, is more contingent upon food than upon any other one point. The past year, which has seen the most severe fighting and the end of the war, has brought home to us the great part which agriculture has played in bringing hostilities to a successful conclusion. Not only have food crops been produced in large quantities in this country, but along with these the other great staples which play such an important part in the supply of the world. Cotton, hemp, wool and fats of all kinds have been produced in increasing amounts, and the farmers of the world, forced to face the most serious obstacles, have responded wonderfully to the call for their products.

The readjustment of farm conditions the world over makes the results even more notable, for in many cases the entire agricultural population has been wiped out, and has had to be replaced with inexperienced persons, while the women and children have responded most nobly. In Europe particularly have these changes been most notable, for here agriculture had resolved itself down to a very exact science, depending largely upon certain types of persons for success, rather than upon the broader and more elastic system, as in America. The loss in Europe of some of its great specialties, as the seed business, certain phases of the live-stock industry and some other factors is going to be very difficult to adjust, and it will be years before Europe gets back to where it was before the war; in consequence the rest of the countries which had depended upon Europe for these specialties will long feel the deficit.

I speak somewhat at length on this because of its probable effect upon America, for it is upon us who have felt the burden of war less heavily that the task of making up what the war has cost to agriculture will fall. We shall have to grow many of the things which we formerly bought from others. We shall have to supply to others what we were in the habit of purchasing. Then, too, we shall undoubtedly have to absorb among us a rather new agricultural population, made up partly of immigrants and partly of our own people, who will seek to readjust their conditions. In any event, there will be an activity in agriculture during the next few years which will be very difficult to keep within legitimate bounds unless it is guided carefully. A long period after the civil war was marked

with evils resulting from little thought for the future, when sections of the country were opened up far too rapidly, when, in the restless movement of our people, old settled districts were deserted for the promise that a new land had to offer; and the consequent loss to the country as a whole would be difficult to determine. America has faced the task of entering the war with a great deal of wisdom, but it will require much more thought and planning to prepare for the future, so that we may avoid the mistakes of the past, and bring our farmers through with some confidence as to their future.

Never before have the farmers of America been faced with the problem confronting us at the opening of the past year. With our armies in the field and training, and every energy bent toward supplying the needs of that army, which resulted in calling upon all available help to go into the factory, shop or government industry; with the farm boys volunteering and the draft taking the rest; with the price of all agricultural commodities far in excess of what they had been previously, with no guarantee, except on wheat, that they would get the cost of production from their crops, our farmers certainly were sadly in need of help. Yet the farmer responded vigorously and with wonderful optimism to the call for food. All sorts of expedients were tried; it was a time of readjustment and experiment. The great staple crops were wanted, so from Maine to California the farmers planted wheat, corn, oats, barley, rye and potatoes, while the great cotton States not only produced their maximum, but also much of their food, which formerly they had depended upon other sections for. The increase in the production of food animals, notably hogs and sheep, was very large, while dairy cattle have been increased to a fair extent. On the other hand, the high price of meats has resulted in a good deal more killing of animals in some sections than was perhaps wise.

Massachusetts Crop Situation in 1918.

Weather conditions in our State were, on the whole, fairly satisfactory. Following the most severe winter within the last forty years we had a fairly early but dry spring with good weather during May. June, however, was cold, and retarded what promised to be a good start for the season, and a very

severe frost was recorded on the nights of June 10 and 20. This did great damage to many of our tender plants, particularly in low places. Very good growing weather followed during July and August, in consequence of which most of the planting affected by the adverse weather in June caught up, and, while September was very wet, growing conditions for late crops were good, and this was followed by splendid weather during October and November, so that with few exceptions grass and other crops have gone into winter in good condition. So far as can be determined from the figures available, the rainfall in Massachusetts for the year averages somewhat below normal.

Massachusetts farmers, in common with those of the whole country, responded splendidly to the call for patriotic service, and in many instances at the expense of their pocketbooks. Massachusetts farming is a business of specialized crops, and so, while the fixing of a minimum price for wheat has of course been of great advantage to grain-growing States, it has not been a factor of importance here. There were no minimum prices for our principal native-grown crops, so that the Massachusetts farmer was forced to take all the risk. In the case of a number of crops this has resulted in heavy losses to the growers.

The striking feature about farming in this State this year has been the increase of grain crops. Wheat acreage, from practically nothing before the war, rose to 700 acres in 1917, and about 2,500 in 1918. This is still a diminutive acreage, but the war has set our farmers thinking about the great staple crops, and it is to be hoped that Massachusetts will never return to the wheatless condition of the years ending with 1914.

Corn acreage was largely increased, from 61,000 acres in 1917 to 71,000 in 1918, the total crops being estimated at 2,806,000 and 3,323,000 bushels, respectively. Hay, one of the crops Massachusetts depends much upon, has been the highest in years. This was due largely to the dry spring and severe winter. The crop has brought about $5 per ton more than previously.

The potato acreage was large and the crop of fair size and good quality, the latest figures showing a production in 1918

of approximately 4,680,000 bushels as against 4,370,000 in 1917.

Coming to our special crops, the onion crop was larger and of good quality. This was the case throughout the country, and very low prices have resulted, in many cases way below cost of production. Sales have been recorded in the Connecticut Valley as low as $1.10 a hundred pounds. To say that the grower has been keenly discouraged is to put it mildly, and there is prospect for a reduction in acreage next year. Two years ago, when there was a nation-wide shortage in onions, and prices went to $12 and $13 a hundred during the winter, there was much loose talk about "speculation" and "robbery," while this year the same papers which were so denunciatory of the farm at that time are now strangely silent over the farmers' losses. Seemingly overproduction, which happens in some crop almost every year, can often be taken care of by a better system of distribution, and by letting the public know that there is likely to be a surplus of a certain crop.

The fruit crop, especially strawberries, was short, and sold for exceptionally high prices throughout the season. Even the sugar rationing did not depress the market, the probable explanation being that the crop was just about large enough for the dessert demand, and so the lack of sugar for canning was not a factor.

Fruit orchards were injured by the severe winter. The peach crop in the State was entirely wiped out, and thousands of trees were killed or irreparably injured. Considerable injury was done to apple trees, especially old trees which had borne heavily in 1917. The amount of injury was at first exaggerated and the apple crop underestimated. The best estimate now is that the crop is 85 per cent of the 1917 crop. As that crop was below normal, it will be seen that this year's yield was not a full one.

The tobacco crop was a good one and has sold well. The demand for smoking material for our army has undoubtedly effected a rise in tobacco prices.

Market-garden crops have varied. Asparagus sold on a fair average through the season. Early truck crops, as lettuce, cabbage and spinach, sold well and were fairly satisfactory.

Early corn was abundant and sold well, but later this crop was hardly worth picking, except in some special markets. This fall beets, carrots and cabbage have been very low, while squash has been almost unsalable. The large squash crop is undoubtedly the reaction from the enormous prices of last winter, when sales were made as high as $80 to $90 a ton.

War Gardens and the Farmer.

There should be a definite understanding in every one's mind of the distinction between war gardens and children's gardens, the latter of which this department has always encouraged, believing that through the influence of this work many of our future farmers would be found. But the war garden was a distinct result of the demand for more food during the war, and in getting this greater supply of food, costs and methods were not considered to any great extent. The war garden has been stimulated through almost every national as well as through many private agencies, with the result that towns, cities, corporations and large land holders have set aside tracts of land for any one to use who so wished. Persons in all walks of life took up this land, and no doubt large quantities of food were produced.

Prices for vegetables have been unfavorably affected by the war gardens. While these have been necessary as a war measure, I doubt the wisdom of continuing this amateur competition with the *bona fide* farmer. If the farmer who has to get a living price for his crops is forced to compete with the amateur who raises vegetables as an amusement, and will sell them for any amount, the farmer will sooner or later be forced out of raising those crops. A movement seems to be on foot to continue the artificial stimulation of back-yard gardening which has prevailed during the war period, and to call them victory gardens. The farmer's position on this should be clear. Anybody who wants to raise a garden is of course at liberty to do so. But with the return of peace it is unwise and unjust to use public money to try to convince people that the cultivation of a garden is an essential element of patriotism. If private organizations intend such a movement at their own expense, let them do so; but farmers are heavy contributors to

the expenses of the State and National governments, and they have a right to be heard as to how that money shall be spent. They should decline to allow tax money to be used to ruin their own business.

The Fertilizer Situation.

The close of hostilities cannot but have a favorable effect on the fertilizer situation from the standpoint of the farmer. Large quantities of nitrate and potash which have been used in the manufacture of munitions will be released for farm fertilizers; more ocean tonnage can be used for transportation of nitrates from South America and pyrites from Spain; and labor for the manufacture of fertilizer will be more abundant. These factors cannot be expected to have an immediate effect in the way of materially lowering prices, but it is safe to say that prices will not go higher than those quoted for 1919, that shipments will be more prompt and regular, and that more high-grade materials will be available. The cession of Alsace, where the German potash mines are located, to France, will undoubtedly result in prompt resumption of exports of potash to this country. This is always provided that the Germans have not put the mine permanently or temporarily out of business. In 1912 and 1913 the United States imported approximately 250,000 tons of potash to this country. This figure fell to zero in 1916, 1917 and 1918, so that for the last three years this country has been dependent on domestic sources of potash. These sources have not been sufficient, however, to supply the normal demands of our agriculture for potash.

The high prices of potash have of course stimulated domestic production, which jumped from 9,700 tons in 1916, to 32,000 tons in 1917, the last year for which figures are available. The principal sources are kelp, certain salt lakes in the far west, and the dust from cement mills. This latter source seems to promise an economical supply of potash even at pre-war prices. It is evident, however, that we must still rely on foreign sources for a considerable part of our potash supply. The continued high price of fertilizers has had the effect of throwing upon the market large quantities of very low-grade and

almost worthless materials under the guise of their having some merit. Farmers should not be induced to buy these materials which are offered at low prices until they have proof of their worth; at the same time, we should do all in our power to have legitimate experimental work conducted on all promising substitutes for the fertilizers we are now using.

Seed Situation for 1918.

The war has had a very stimulating effect on the production of farm and garden seeds in the United States. Many seeds, the supply of which we formerly relied on Europe for, are now being produced in this country in large commercial quantities. This is a branch of specialty farming which should certainly be retained in this country, and for certain kinds of garden seeds Massachusetts farms are well adapted. Seed growing, however, is a branch of farming which requires an unusual combination of skill, knowledge and experience. Our agricultural college must plan to offer some practical courses in commercial seed growing, in order to give men who desire to go into this work at least the fundamental principles of the business.

The Bureau of Markets of the United States Department of Agriculture now maintains a seed-reporting service, and the stock on hand July 1, 1918, the commercial acreage of seeds planted during the past year, and the estimated production, all show large increases over the previous year. This is notably the case with spinach, which reached an extremely high price in 1917. On July 1 the stock on hand of this seed was two and one-half times that of the previous year, and 3,942 acres of this crop were planted for seed as against 1,415 acres in 1917. The estimated production is given as 1,560,000 pounds against 200,000 in the previous year. This should result in lower prices, which will certainly be welcome news to the market gardeners. The same prevails in a less degree in such garden seeds as beans, beets, carrots, onions, parsnips, peas and sweet corn. With a few crops, notably cabbage, cucumbers and lettuce, domestic production has been less than a year ago.

In the field of farm seeds wheat will of course be high, owing to the government-fixed price. Corn will be in good quantity and well-ripened, which was not the case a year ago. The

1918 timothy seed crop was short and the quality inferior, and clover still continues high in price.

European conditions, which have been a big factor in our seed supply, must be thoroughly understood, and reports now coming in show a still greater shortage of the better strains of fine vegetables and certain farm seeds than last year. Many of the large European seedsmen have lost a part of their trained men, and it will be years before they are on a producing basis comparable with pre-war conditions. Not only have they lost their men, but through forced neglect many of the better varieties have been lost, and they will take time to build up again. All of this points to an added incentive for our country to get into seed production, and become less dependent upon Old World conditions.

Farm Machinery.

The Legislature of last year made available for this Department the sum of $100,000 to purchase and operate farm machinery, to which the Governor and Council added an additional amount of $8,000 to be used in order to get greater food production. This measure was loyally supported by the Food Administration, and while considerable opposition to it developed in some sections, on the whole the plan had general support.

A committee composed of members of the Food Administration, together with the Board of Agriculture, had general oversight of the plan, and Mr. L. R. Smith of Hadley was engaged to superintend actual operations.

As the intent of this operation was the production of more food, it was not always possible to assist the most deserving farmers, but, rather, to use the machinery on the available and easily worked land. While $100,000 seems a large sum of money to expend on an experiment of this kind, and while it would seem to accomplish a great deal, yet the total results of this must not be looked for in actual acres plowed and harrowed, or in grain reaped and threshed, but, rather, in the wider influence upon the farmers themselves. While we could not by any means reach them all, yet there was a real feeling that for the first time the State was taking enough interest in

their affairs to actually place tangible means of help before them. Then, too, there has been demonstrated the value of the tractor in our State, and this has probably been of untold help in giving to our farmers some idea of the place the tractor occupies in agriculture.

While this was purely a war measure, and the question of continuing the work comes up for discussion now that the war is over, we must not lose sight of the fact that we have encouraged many farmers to put in grain and cereals, giving them to understand that they would have the help of this machinery in the coming year to help harvest the crop. The question, therefore, comes up as to whether or not we can let this work drop and not help out these men who have responded so loyally to the call for greater production.

The State should certainly purchase and operate at least two tile-laying and ditching machines. These machines can be kept busy during eight months of the year, and, judging from the experience which other States have had, this is one of the most important aids to agriculture. I would recommend that this be done. Receipts from the farm machinery project up to November 30 were $14,020.17. Twenty-six machines were leased and the following work done: —

Harvested (acres),	334
Hay baled (tons),	287
Plowed (acres),	2,719
Harrowed (acres),	3,892
Threshed (bushels),	33,346

The American Plant Pest Committee.

After the white pine blister rust made its appearance in the country, and its spread became a cause for alarm, there was organized a committee known as the White Pine Blister Rust Committee of North America, and its membership was made up of pathologists, foresters and other State officers having forestry work under their jurisdiction. This committee has been successful in arousing people to the danger from the spread of this disease, and through its efforts control work is well under way all the country over.

At its last meeting, held in Boston November 11 and 12, it was decided to reorganize the committee into a body to be known as the American Plant Pest Committee, and to ask that each State of the Union appoint four delegates to compose its membership, these members preferably to be State officers directly connected with agriculture, forestry, entomology and pathology. The organization of this committee is now under way, and promises to become one of the most powerful influences in the control of plant diseases and insect pests in North America.

The time has gone by when the problem of a new disease or insect fails to affect the country as a whole. The appearance of citrus canker in Florida, the pink boll worm in Texas, the corn borer in Massachusetts, and the potato wart disease in Pennsylvania are national questions; for while these pests may not spread all over the country, their appearance affects the well-being of the farmer, and consequently the whole people.

This committee is also deeply interested in preventing the introduction of new pests from other sections of the world, and it is gratifying to report at this time that the Federal government, through its Horticultural Board, has placed a quarantine upon all shipments of nursery stock, this to take effect as of June 1, 1919.

At the present time the committee expects to place before the country the situation relative to the corn borer, and by a systematic campaign to bring the danger from this pest before the whole country. The potato wart disease will also be taken up.

It is hoped that the work of this committee will have a direct effect on preventive and control measures.

The Drainage Board.

The Drainage Board, created by the Legislature of 1918, and the new drainage law have not been in operation long enough to show any definite results, particularly as under war conditions very little could be done. The enactment of this law seems to mark the first step toward placing in the hands of the landowner an adequate plan whereby actual drainage operations may be undertaken.

The Board had the sum of $1,000 for its use during 1918, but owing to the difficulty of getting engineers, very little work could be undertaken. Some survey work started in 1917 has been completed, and a pamphlet explaining the operation of the law has been prepared.

In planning for the future it is quite apparent that when the country returns to normal conditions there will be a great demand for the services of this Board.

Some investigations of the possible uses of peat have been made, but the findings of the Board do not justify the development of peat bogs for fuel at this time, when coal is still abundant. That peat has certain uses in industries has apparently been demonstrated, and its development in some lines has been begun in several sections of the State with fairly satisfactory results. The use of peat in agriculture as a direct fertilizer is still in the experimental stage, and seems to offer much opportunity for further study, but the field of most practical work seems to be in the drainage of certain types of peat lands in order to use these lands for agriculture. Your commissioner made a trip to New York and other States in order to look over some of these reclaimed peat lands, and, judging by the crops of market-garden truck, potatoes, grain and onions, it would seem that Massachusetts would be justified in entering upon a very comprehensive plan for the drainage of certain of our wet lands.

Dr. Eugene R. Kelley of the State Department of Health is chairman of this Board, and Wilfrid Wheeler of the Department of Agriculture is secretary.

Massachusetts Soldiers' Land Commission.

Conforming to a request from the Department of the Interior at Washington, the Governor appointed the following as members of a commission to investigate the situation in Massachusetts relative to land for returned soldiers: —

Wilfrid Wheeler, *Chairman*
Warren H. Manning, *Secretary*
X. Henry Goodnough
F. W. Rane

There seem to be many conflicting opinions expressed, both in papers and by persons, relative to this subject. Many of these opinions have been formed before the person stating them knew of the final plan which has now been worked out; also many persons have expressed themselves without considering the question in a large way.

Briefly stated, the plan which the Department of the Interior has approved for placing soldiers on land is as follows. It is the intention of the Department of the Interior to place men in colonies of not less than 100 members to each colony, and the limit of the colony would only be reached by its limitations of land and markets for its products. The minimum acreage which they consider essential would be not less than 10,000 acres. If after an investigation any State wishes to cooperate with the national government, and will furnish suitable land, the government will then do the necessary reclamation work, whether that means drainage, clearing or irrigation, with the understanding that its money will be paid back by the settlers in annual instalments, covering a period not greater than twenty years. The State will lend its credit to a certain extent in building and stocking these farms. Applicants for land under this condition must have, by the government plan, at least one-third of the necessary capital to finance themselves. They must be approved farmers, or if not, must have gained experience either by working on farms approved by the government, or else by some other method proved themselves capable of handling an agricultural proposition.

The advantages of this scheme are apparent, inasmuch as a group of men put together in this way will have common interests, and they will be able to organize themselves into cooperative associations for the purchase and sale of material. Their social and educational problems will be mutual, and the ultimate object of it is that they will own their own land, and be absolutely free and independent of any governmental control beyond that which has to do with the payment for their farms and equipment.

The fact that the Secretary of the Interior first drew attention to the large areas of unused land in the country, and later the President spoke of it to Congress, has led many to believe

that the development of this land for immediate agricultural uses was planned; but when it is considered that much of the land under discussion would be eliminated as agricultural land, and, still further, that the process of making this land available for agricultural purposes will often take at least ten years, and much more of it fifty, the immediate effect on agriculture will not be felt, particularly so if the country increases in population as much during the next ten years as we may normally expect.

There are some aspects of this question which must be considered carefully, and it behooves the friends of agriculture to look into this lest the movement get away from us and do us real harm.

In the first place, there will be considerable readjustment of our living conditions after the war, and not only some of our soldiers, but also many others who have always wanted to farm, will be looking for land. The greatest inducement will be offered these people in the west, southwest and south, and while there will probably not be a parallel of the conditions which prevailed after the civil war, still, New England and the northeastern States may find themselves confronted with a proposition similar to that on a smaller scale.

If we can induce some of these people to settle among us we certainly will be on equal footing with them, and if they beat us out it will be our own fault.

This movement has been cited as a cheap food campaign, and, in fact, your commissioner has been accused of taking the side of the consumer against the producer. This brings up a rather interesting subject, to be treated later, as to how far the consumer's and producer's interests are mutual. Unless this subject is handled carefully there is danger of developing land and producing crops faster than they can be consumed, but in the hands of people who know the subject they are dealing with it may be guided into safe channels.

Massachusetts offers in this connection many inducements for settlers, not only soldiers, but others who would make good farmers, and who might be desirable to have among us. The commission appointed by the Governor so far has only concerned itself about the available land within the State, — its location, character, present condition and means of reclamation.

This land is of several general types, — cut or burned over uplands; wet lands divided into swamps, river meadows and salt marshes; forest lands; rocky and hilly pasture lands; and lands needing water. The largest tracts of these lands have been located and a report of their condition forwarded to Washington. It is also the plan of the commission to present to the Legislature a bill covering the acquirement of some of this land and its possible settlement, and the co-operation of the national government is hoped for. There is undoubtedly going to be enough pressure brought on Congress this winter to force something of this sort through, and New England should see that her interests are protected.

A New England committee has also been formed and is co-operating with the Massachusetts commission.

In order to take care, in a permanent way, of the survey, reclamation and settlement of our waste lands, I recommend the creation of a division of reclamation, colonization and soil survey, under the Department of Agriculture.

The Producer and Consumer.

We often hear the expression, is it in the interests of the producer or the consumer; or the producer's side as against the consumer's is discussed.

There will always be a direct conflict between these two great interests, for of course one is trying to get what he purchases as cheap as possible, while the other looks to get all he can out of what he sells. We must remember this fact, however. We are all consumers. A good many of us are producers, not always necessarily of actual products, but some with products and some with labor. So far as the first point is concerned we are all alike. As to the second point, the producer should take a very lively interest in the consumer, because it is from him that he must expect the return for that which he produces. One of the last things the producer can afford to do is to antagonize the consumer, and particularly does this apply to the farmer here in New England, for the consumer of New England has considerable choice in the purchase of his agricultural products, and it would not be difficult for him to buy products from distant points just as easily as those grown here.

How does business treat this subject? Generally it goes on the principle that a satisfied customer is a permanent customer, and if it holds its customers, business prospers. How has the farmer treated the consumer? Speaking generally, if the customer could purchase products grown outside of New England he would very much prefer to do so, as he would be surer of getting a well-packed, uniform article and at not much greater price. We have seen this happen with some of our larger products, as apples, market-garden crops and milk. Our markets have been filled with these products, often produced 3,000 miles away, and New England consumers are buying these products in preference to those grown near by.

There is no doubt that if New England could satisfy her own consumers she could have markets all over the world for her products. We have seldom considered the possibility of shipping to other markets. Here is a wonderful opportunity to supply markets to the south of us with our products which mature after the local crop is gone. There has probably been no time in the history of New England when there was spread before the farmer the opportunity of getting back the market for his goods which he has lost. Attention has been called to food products by the war. The average citizen is interested to see this section flourish, but the average citizen is not going to stand for poor goods, no matter where they are grown. Our farmers should meet the consumer more than halfway, and try to influence him to trade in New England and buy New England products.

Food Production Committee.

This committee, organized in 1917, has been very active in securing greater food production. Its membership has been made up from all organizations dealing with agriculture, and its program has been to get every one busy in some form of food production and conservation. Its work has been done largely through committees who have worked with local committees in the towns of the State, and has been devoted mainly to the following questions: marketing, crops and animals, labor, credit, gardening and boys' and girls' production work.

With the passing of the Food Administration there does not seem to be the demand for the continuance of this committee, and its work will be dropped this year.

Commissioner's Travel.

Your commissioner has done very little traveling outside the State beyond three trips to Washington and one to Michigan, Indiana and New York.

One of the trips to Washington was to attend the meeting of farm organizations. This body represents a large number of farmers organized throughout the country, and has been instrumental in getting the farmer some recognition in Washington in relation to war measures. It was as a result of this meeting that the President appointed the Agricultural Advisory Committee, which has been of considerable help in directing the agricultural policy of the administration.

The western trip was to look over wet land conditions in Ohio, Indiana, Michigan and New York, and while this trip had to be somewhat hurried, it proved to be of great value in seeing at first hand what other States are doing with the same kind of land of which Massachusetts has an abundance and which here is lying idle and unproductive. The great swamps of Ohio and Michigan have been drained and are producing large crops, while all about them is seemingly good land, very much the same as in our State. The same objection to the development of these areas was raised in these States as is common here, namely, that as long as there is still some unoccupied land no new land should be developed. The objectors seldom realize that much of the land we are now using should never have been developed, while these areas of swamp, when once drained, make the most easily tilled land. Great mistakes in drainage are apparent in some of these areas. There is often the tendency to take out too much water, and in some instances the wrong types of soil have been drained. Remarkable crops of onions, celery, market-garden crops, hay and grain were noted, while in some places the smaller drained areas were used for dairying. In New York many areas of less than 20 acres have been drained and are used largely for growing lettuce and cabbage, and the farmer is considered lucky who has one of these bogs on his farm.

Market Law.

The past year has brought up more forcibly than ever the need of a market law, and some adequate method of assisting the farmers of the State in this great work. Over thirty markets have been opened up in the State, and these are often in need of assistance, as well as are the farmers who attend them. Very successful markets are being conducted in Springfield, Cambridge, Boston, Quincy and Lowell, and there seemed to be a growing demand for these markets during the summer.

Mr. Annin visited the markets of Baltimore, Maryland, and Lancaster County, Pennsylvania, and found the following conditions: —

The city of Baltimore has ten markets. These markets are all market buildings which are owned by the city, and the direction of the work is under a market master who is responsible to the city controller. There is an assistant master in charge of each market.

The city of Lancaster is a city of 60,000. It has six market buildings, one of which, the central market, is owned by the city and the others by private companies.

Conditions which prevail there are: —

1. A peculiar race of farmers who have been accustomed for generations to the retail selling of fruits and vegetables.
2. A consuming public which is willing to get up very early in the morning and do its marketing by the basket method rather than by the telephone.
3. A system of farming where little field work is required from haying to corn cutting.
4. A local institution that has been in existence for over a century.
5. An entire absence of green grocers.

Massachusetts is certainly very backward in establishing what is considered so important an undertaking by over thirty other States which have departments of markets.

The discontinuance of the work of the Food Administration places an additional emphasis upon the need for a division of markets, inasmuch as the people of the State have become accustomed to some market service, and will undoubtedly demand that this work be carried on. I therefore recommend that such a division be created under this Department.

The Constitutional Convention and the Farmer.

The acceptance by the people of all the amendments to the Constitution, as proposed by the convention, in some ways affects us all, but there are three measures which very directly affect agriculture.

The first of these, the anti-aid amendment, has been in operation now for about one year. This measure affected the farmers in so far as the State bounty was extended to agricultural societies.

The second, the initiative and referendum, makes it possible for any group of people to initiate legislation and put it through over the heads of the Legislature. That this form of legislation may be used by the farmer is possible. It, however, puts into the hands of the people a force which they have never had before, the wisdom of which is very questionable. The possibilities for good or evil under this system are enormous. In so far as it affects the farmer, it is hoped that resort to it will only be upon very important measures, and only after other means have failed.

The third, the amendment relating to the development of our natural resources, brings home to the farmer a rather more serious problem, in that this amendment declares that the conservation, development and utilization of all agricultural resources are public uses. Under this amendment not only could the State seize any agricultural land under the right of eminent domain, but it could delegate this very dangerous power to private corporations or individuals, so that there is a possibility that it might ruin the business of farmer A to improve the business of farmer B, on the ground that the latter's business was more useful to the public. I am not predicting that the Legislature ever would do this, but the amendment gives them this power, and it is up to the farmers to see to it that the power is wisely and judiciously used.

REORGANIZATION OF THE BOARD OF AGRICULTURE.

The Legislature of 1918 undertook the reorganization of the Board of Agriculture.

The Board, through its executive committee, made certain recommendations, particularly looking towards a consolidation of departments, believing that in bringing State agricultural work under one department much better results would be accomplished. While the Board introduced no bill, it filed its recommendations with the committee in charge.

The farmers of the State were apparently little interested in the matter, as there was a small attendance of them at the hearings, and little influence was exerted. The principal changes made by the Legislature were in reducing the Board to fourteen members, one from each county, appointed by the Governor, and in changing the name of the executive officer from secretary to commissioner, of including the commissioner as a member of the Department, and of increasing the term of office of the commissioner.

The following members were appointed by the Governor: —

Barnstable County,	John Bursley, West Barnstable.
Berkshire County,	Fred G. Crane, Dalton.
Bristol County,	Charles I. King, Taunton.
Dukes County,	James F. Adams, West Tisbury.
Essex County,	Stuart L. Little, Newbury.
Franklin County,	George E. Taylor, Jr., Shelburne.
Hampden County,	Edward E. Chapman, Wilbraham.
Hampshire County,	Leslie R. Smith, Hadley.
Middlesex County,	Fred F. Walker, Burlington.
Nantucket County,	Charles E. Burgess, Nantucket.
Norfolk County,	Evan F. Richardson, Millis.
Plymouth County,	Joseph J. Shepherd, Pembroke.
Suffolk County,	Willis Munro, Jamaica Plain.
Worcester County,	Herbert N. Shepard, Warren.

The new Department met July 9 to elect a commissioner of agriculture, and Wilfrid Wheeler of Concord was elected to serve for three years. The complete organization was brought about on September 10, when the first regular meeting of the new Department was held. Mr. John Bursley of Barnstable was elected president, and R. Edwards Annin, Jr., recording secretary.

Recess Commission on Sheep Industry, Agriculture and Related Matters.

The Legislature of 1918 appointed a Recess Commission on Sheep Industry, Agriculture and Related Matters, the purpose of this commission being a thorough investigation of the feasibility of re-establishing sheep in our State.

The commission has traveled to all sections of the State, and has held quite a number of hearings, in order to get at the views of the people. One trip has been made to Maine in order to see a large flock of sheep kept there under typical New England conditions. A thorough study of the situation from all standpoints is being made by the commission, and it is hoped that a comprehensive report will be made upon which the foundation of a new sheep industry can be laid within our State.

Your commissioner has placed before this commission plans which he believes will go a long way toward assisting in the general development of this industry, and which, while it involves some expense to the State, is in the line of direct aid and assistance to the sheep breeder. The following is an outline of these plans: —

Outline of $5,000 Plan.

The sum of $5,000 to be used in sheep work for State.

Divide State into three sections with sheep man for each section: —

First section, four western counties.

Second section, Worcester, Middlesex, Essex counties.

Third section, Bristol, Plymouth, Norfolk, Barnstable and Dukes counties.

In each county have headquarters on a reorganized sheep farm where owner is practical sheep man. Have owner act as agent for Department.

Qualifications of Owner of Farm. — First, must be practical sheep man; second, must own small flock; third, must be interested in sheep and a successful breeder; fourth, must be willing to help in sheep problems.

What the Farm will be. — First, headquarters of the agent in the county; second, open for inspection by farmers at all times; third, should have fairly good buildings and equipment for sheep industry; fourth, telephone connections.

It should be the purpose of the Department to establish at all these farms, places of exchange for sheep, lambs, rams and wool. While the Department would not attempt to actually open a market at these places, it should be a part of the plan to keep on hand a list of the sheep, etc., for

sale, and in case of a man being forced to place his sheep or lambs on the market, the agent may purchase such as he thinks desirable for breeding purposes. The farm may become the center for the collection of wool for shipment at larger markets.

A Plan to use $10,000 for the Encouragement of Sheep Industry.

Same as in first plan, using more farms, as follows: —

Berkshire County,	2	Bristol County,	1
Hampshire County,	1	Plymouth County,	1
Hampden County,	1	Barnstable County,	1
Franklin County,	1	Nantucket County,	1
Worcester County,	2	Dukes County,	1
Middlesex County,	1	Norfolk County,	1
Essex County,	1		

Work the same as in first plan; farms the same. On some special farms place better rams for use of farmers, to be controlled from central farms. Make provision to sell better stock at cost to such farmers as cannot afford to purchase.

Financial Statement.

$5,000 Plan.

3 agents at $750,	$2,250
14 farmers at $100,	1,400
Miscellaneous expenses, — telephone, travel, postage,	1,350
	$5,000

$10,000 Plan.

Same as the first plan, but 5 more farmers added,	$500
Provide for purchase of 25 rams, pure-bred,	2,500
Purchase of breeding stock, limited only by appropriation.	

A modified type of these plans is already in operation, as we already have an agent in Essex County who is doing a great deal towards bringing about better sheep conditions there.

The question of a reduced price in wool, now that the war is over, should not retard sheep husbandry, for while we are bound to see lower prices, sheep should not be kept for wool alone, but rather for general purposes on a farm. We have not considered them very much from a meat standpoint, and yet here is an opportunity to use large numbers of these animals. Among those who have carefully considered the question from all angles, there seems to prevail a general feeling that a sane development of the industry is desirable for the good of New England agriculture.

The Milk Situation.

From figures available at this writing it is evident that not only the number of dairy cows in Massachusetts has increased during the year, but also the amount of milk consumed. This is proof that the dairy situation has improved.

A remarkable combination of circumstances has contributed to this result. McCollum's discovery of the growth-promoting substance in the fat of milk, which he calls Fat Soluble A until such time as chemical analysis can provide a more appropriate name, has been universally heralded. The dissemination of hundreds of thousands of circulars and leaflets relating to food value of milk and milk products, written by Mr. Harwood and published by this Department, has been no small factor locally. Much credit should also be given to the Federal Food Administration and the demonstration agents of the agricultural college and farm bureaus for distributing this and other similar literature during the year, all of which has helped to shape the public mind to the importance and economy of using more milk.

The price of milk, fixed from time to time by the Regional Milk Board, the care of the surplus, and the work of the Milk Administrator, Dr. Gilbert, are mainly responsible for the fact that for the first time milk has been produced in a large way for cost, plus a reasonable profit. The farmers are also learning the advantage of co-operation from their membership in the New England Milk Producers' Association, of which Richard Pattee is secretary.

Dairy farmers all over the State, particularly in the western and central sections, should raise more heifer calves from the best stock available, and no calves should be raised from other than the best of pure-bred bulls and either high producing grade or high producing pure bred cows. By adhering to this method the milk-producing machinery of the dairy cows can be greatly improved. The grade heifer contest, started by this Department this year, should be continued as encouragement to the practical dairyman to engage in raising his own cows. The clean milking contest should also be continued as an incentive to young people to excel in this work upon our dairy farms.

The appearance in this country of commissions from Europe to buy pure-bred cattle to restock depleted areas is indeed a hopeful sign for the breeders of these animals, and impresses us anew with the fact that more pure-bred animals should be produced, as there always seems to be a demand for these at prices which are generally profitable.

Production of Food Animals.

It is very gratifying to note the increasing interest being taken by our farmers in the production of beef cattle, sheep and swine, and while no definite figures are available, the increase is very considerable. Quite a number of former dairymen have given up their dairy cattle and replaced them with beef animals. While a few years ago it was distinctly rare to see a Hereford or Angus in our State, it now has become quite a common sight. Sheep, too, have been added in quite large numbers, and would undoubtedly increase to a much greater extent, provided there were more adequate protection afforded them.

Poultry Situation.

The curtailment in all lines of poultry production, brought about in 1917 by the scarcity and extreme high prices of feeds, continued into 1918, with the result that there is now less poultry in the State than at any time since poultry products became an important source of revenue to Massachusetts farmers. This situation is to be deplored, yet in effects to the present time it is not as bad as it appears from the point of view of diminished poultry production.

Most of the labor diverted from poultry keeping has been as profitably employed in other lines, much of it in essential war work. Nor does the lower production of this year signify a more pessimistic attitude among poultry keepers, or less favorable conditions than last year. It is now generally recognized by experienced poultrymen in this and adjoining States that, while circumstances created by war conditions called for the most conservative management, most poultry keepers went beyond this and cut production too much. Few saw this, however, until the 1918 hatching season was well advanced,

and it was too late to make arrangements for substantially larger production this year.

Under such conditions new interest in poultry could not develop as usual, but, in spite of the discouraging aspects of the situation, poultry keeping has gained a goodly number of new recruits. Among farmers who have heretofore been indifferent to its advantages there is a decided tendency toward poultry keeping on a scale that will at least supply the farmer's table liberally with poultry products. In the latter half of the year there was a marked increase in the number of back-yard flocks. Both of these movements seem likely to make rapid headway in 1919. With other industries going back to a peace basis, it is to be expected that a considerable proportion of those formerly engaged in poultry keeping will take it up again.

It is in the coming reconstruction period that the community as a whole will feel most the effects of the excessive reduction in stocks of poultry. The return to the former scale of production cannot be made in one season, or in two or three seasons, by ordinary growth. Meantime, instead of selling large quantities of high-class stock to other sections of the country, Massachusetts poultry keepers, as a class, will be heavy buyers of stock from sections they formerly supplied.

At the present time the prevailing opinion among experienced poultrymen seems to be that it will take at least five years to recover the ground lost the last two years, and that it will take nearer ten years to entirely overcome the effects of this loss. While this seems to be the general opinion, some well-informed men take a much more optimistic view, maintaining that with such State agencies for the promotion of interest in poultry and for assisting poultry keepers with information and advice, as now exist, and such as may be developed by the appropriate extension of the work of departments, the State can materially shorten the period of reconstruction, and bring about the full rehabilitation of the industry in a much shorter time. As one means to this end it is suggested that the Department of Agriculture should undertake work for poultry interests similar to its long-established work for dairy interests.

Our State Farms.

Massachusetts has something over twenty-five farms on our State institutions and hospitals. These farms should form the basis of a closer touch between the State and the farmer. Several of these farms are splendid examples of how a farm should be run, while others are anything but a credit to the State. It would seem that the time has now come when these farms should be placed under the direction of some person capable of utilizing the advantages of the good ones and developing the less fortunate ones. Pure-bred stock seems to be in demand. Some of these farms are well supplied with this stock, others are not. The director of these farms should by careful breeding restock the depleted herds, and as soon as possible place such desirable male animals among the farmers of the State at reasonable cost, so that there will be little excuse for keeping scrub bulls. Then, too, these institution farms might become the training places for some of our young people who cannot afford to go to the agricultural college, and yet who wish to become farmers. There is a possible use for these farms far beyond their present development.

The Agricultural College.

The continued withdrawal of our young men into the army, and other phases of war work, has reduced the attendance at the college to a very low ebb in the general courses. Many classes formerly including 60 to 70 students have dropped to 15 to 20. Practically all of the colleges have been affected in the same way. During the late summer the government took over the colleges of the country and organized them in S. A. T. C. camps, and while this gave the colleges a large attendance it did not affect its general course of work, as most of the student army were being trained for war.

The sudden cessation of hostilities has again upset the colleges, for the S. A. T. C. work has been dropped, and few of the student army will stay to take the regular courses. During this rather trying period our college has maintained its regular work, at the same time giving many of its staff and students to army work.

Several phases of the college work and that of the Department present themselves for consideration and adjustment. For several years there have been attempts made to bring about some changes in the work of these two bodies.

A general agreement was reached at one time relative to an exchange of work, also as to the functions of the organization, but nothing definite has resulted from this exchange of views. It would seem that that time has now come when there should be some definite action taken toward settling these questions, and your commissioner would recommend that this matter be taken up at an early opportunity. I specifically recommend that the enforcement of the fertilizer and feed laws should be transferred from the college to the Department.

Nursery Inspection.

The work of the Nursery Inspector this year has been confined chiefly to the inspection of nurseries, white pine blister rust and European corn borer. The nurseries were inspected for all pests and plant diseases, and, considering the shortage of labor which all nurserymen experienced, the conditions were considered very satisfactory. It was especially gratifying to note the decrease of San José scale and white pine blister rust in the nurseries.

On account of government regulations there was a great falling off of the importations of stock. This was especially noticeable of European shipments; yet even with this limited supply pests were intercepted, any one of which, if it had become established, would undoubtedly have proved serious.

The white pine blister rust was carried on along the lines recommended by Dr. H. T. Fernald, who had charge of this work last year. At that time eradication areas were established in Petersham, Dana, Barre, Hanover, Halifax, Duxbury, Marshfield, Pembroke and Hanson, where all cultivated Ribes (currants and gooseberries) were destroyed. Mr. R. M. Marble has had the supervision of the blister rust work this year. Our policy has been to continue the work in the Hanover and Barre areas, removing any cultivated bushes which were missed last year, and at the same time destroying all wild Ribes. This plan in operation made it necessary to cover practically every

foot of ground, giving especial attention to swamps, along streams, walls, etc. Following this method we eradicated 13,466 acres, removing 16,045 bushes in the Hanover district, and 8,075 acres in the Barre district, where 245,110 bushes were destroyed. The last Legislature passed a bill for $8,000 providing reimbursement, under certain conditions, to persons who lost currants or gooseberries through the action of the State Nursery Inspector in 1917–18 in attempting to check the spread of the blister rust. This was very helpful, and satisfied to some extent the owners who were obliged to lose healthy, undiseased bushes in the chosen eradication areas.

The European Corn Borer.

We are now confronted with the European corn borer, a decidedly new pest, one that attacks garden crops, and, from present indications, appears to be capable of causing greater damage and be more difficult to control than any previously imported pest. This borer was first noticed in the vicinity of Medford in the summer of 1917. A careful investigation and study of the insect shows it to have an unlimited supply of food plants. As it feeds inside, it is protected from sprays, is apparently not affected by extreme cold, and produces two generations each season. Garden plants, both flower and vegetable, such as hollyhocks, dahlias, beets, celery, potato and tomato vines, all weeds of the same nature as barn-yard grass, burdock, ragweed, etc., together with both sweet and field corn, furnish food and hibernating quarters for this pest. The infested area is now comparatively small, comprising thirty-four towns mainly north and west of Boston, and everything possible should be done to fight this borer in its present habitat. The outbreak of this pest has emphasized the fact that this Department should have broad powers to deal with these outbreaks as they arise, and I recommend the broadening of the powers of the nursery inspection law to accomplish this.

Apiary Inspection.

The work of this division has been along the usual lines and has been carried on by Dr. Burton N. Gates of Amherst, with the assistance of three deputy apiary inspectors, Messrs. O. F.

Fuller of Blackstone, Edwards Thorne of Worcester, and Ivan Rawson of Pittsfield, whose services were available throughout the apiary inspection season, with the exception of Mr. Rawson who was called in the draft.

During the year beekeeping agents were appointed in twenty-five towns in the State. These agents distribute literature in their localities and answer such questions as may be brought to them by local beekeepers who perhaps have not had as much experience as they, and have been of great assistance to the Department.

Dr. Gates, who has been State Inspector of Apiaries since July 1, 1910, and who has rendered invaluable service to the State, has resigned his office to take a position as professor of beekeeping at the Ontario Agricultural College. It is recommended that the work of the apiary inspection service be carried on under the direction of the State Nursery Inspector in the future, and that the title of this work be changed to Division of Plant Industry.

State Ornithologist.

The State Ornithologist has made an inquiry regarding the present scarcity of game birds, devoting particular attention to the recent decrease of the ruffed grouse and its causes.

He has organized a corps of observers in Massachusetts and adjacent territory to report upon the distribution and migration of Massachusetts birds.

A bureau of information has been established by means of which observers are kept informed of expected movements of birds, and warned to be on the lookout to report such movements in their territory.

He has co-operated with the Commissioners on Fisheries and Game in the protection of sea birds breeding along the coast, and in their attempt to increase the numbers of the nearly extinct heath hen.

He has acted as consulting economic ornithologist to a large and increasing number of citizens through personal attention or by correspondence.

He has collaborated with the Massachusetts Forestry Association and the Massachusetts Audubon Society in preparing an

Arbor and Bird Day bulletin for the public schools, and has prepared some material for publication on means of attracting birds, a part of which was published late in the year; also he has published a provisional list of birds of the Commonwealth for the use of his correspondents, and has tabulated a list of the collections of birds in the State which are open to the public or may be used by students.

Dairy Bureau.

The Dairy Bureau has prosecuted 86 violations of the dairy laws during the year, and has secured convictions in 85 of these cases. The general agent has prepared a new edition of the illustrated folder entitled "Food Value of Milk," and 300,000 copies have been printed.

He has also rewritten eight leaflets, B, C, D, E, F, G, H and J, and written ten new leaflets, K, L, M, N, O, P, Q, R, S, T, 92,500 copies of which have been printed. Two large leaflets, AA and BB, illustrating the importance of milk in food menus, have been prepared, and 120,000 copies have been printed; also a combination of these leaflets in one, entitled AA–BB, 20,000 copies of which have been printed each in the Italian, Polish and Yiddish languages.

The general agent has delivered sixteen lectures relating to the food value of milk, and E. V. McCollum, M.D., of the Johns Hopkins University has delivered two lectures covering his original research on the same subject, one at Worcester and the other at the State House, Boston.

A clean milking contest and a grade heifer contest have been successfully held. In the clean milking contest, which was this year conducted with a view to encouraging women and minors to assist in the work of milking on dairy farms, as well as to improving the methods, 185 entrants competed, and 97 prizes were awarded.

In the grade heifer contest, which was held for the purpose of encouraging the rearing of superior grade heifers of the several milking strains, 30 owners made entries of 123 animals, and 36 prizes were awarded.

The Dairy Bureau made an inspection trip to Maine to visit the milk-receiving stations of the Turner Centre Dairying

Association. These were found to be in excellent condition and a credit to the general manager, Mr. Bradford.

The Bureau was represented by the general agent at the Milk and Dairy Farm Exposition held in New York in May.

Dairy exhibits were made at the January meeting of the Board of Agriculture at Worcester, and an interesting cottage cheese demonstration was given. Much preliminary work was done in arranging for other exhibits at different fairs in the State. Some of these, however, were given up on account of the outbreak of the Spanish influenza during the autumn months. On the whole, notwithstanding the handicap of help shortage and other drawbacks resulting from war conditions, the work of this Department has been highly creditable. As the Dairy Bureau as such went out of existence at the time of the organization of the Department, I recommend the creation of a dairy division, with a director responsible to the commissioner.

Apple Grading Law.

The enforcement of the apple grading law has continued along the lines indicated in my last report. Mr. R. E. Annin, Jr., has again had charge of the work, with Mr. F. H. Greeley of Salisbury, Mr. Karl M. Perham of Chelmsford, and Mr. C. S. Rogers of Newbury as inspectors in the field. Mr. Charles L. Reynolds of Brookline and Mr. Irving K. Wells of Newburyport, the latter an agent of the Dairy Bureau, were also employed for a short time.

The policy of the Department in enforcing this law has been, during the two years, to educate the apple trade as thoroughly as possible to the requirements of the law, and to give the grower, dealer or packer the benefit of every reasonable doubt. The enforcement has become more stringent by gradual degrees, and the law having now been in effect nearly four years, it is fair to assume knowledge of it on the part of those engaged in the apple business.

Some trouble has been found this year with overfacing barrels which were marked ungraded. This is distinctly forbidden in the law, one of the most valuable provisions of which is that the face of the package must fairly represent its contents.

During the year ending November 30, five cases were entered in court, all of which were won by the Commonwealth, and fines imposed. One of these cases was carried over from the previous season, and six cases in the present season have been tried since November 30. This makes a total of fourteen cases sinces the law has been in effect. When compared with the number of apple growers in the State, and the number of individual shipments, the number of court cases is remarkably small. Five of the New England States now have an apple grading law, Rhode Island alone being without it. As Boston is the principal New England market, it has been evident for some time that greater uniformity among the laws would be of advantage to the business in general. For this reason a meeting was called in Boston, in May, of representatives of all the New England States to consider the subject. Representatives of Massachusetts were your commissioner, who was made chairman of the committee, Mr. W. A. Munson, president of the Massachusetts Fruit Growers' Association, Professor F. C. Sears of the Massachusetts Agricultural College, Mr. A. W. Otis of Boston, and Mr. R. E. Annin, Jr., of this Department. The laws of the five States were carefully compared and the differences ironed out. Two later meetings were held, one in Boston in July, and one in Portland in November, at the time of the New England Fruit Show. As a result a uniform law has been drafted and has been agreed on by all six States, including Rhode Island. This law has been referred to leading fruit growers in each State, and has the backing of fruit growers' associations and buyers, dealers and exporters.

The law differs very little from the present Massachusetts law, the two main changes being that A grade apples will hereafter have to be handpicked, and the term "ungraded" will be changed to "unclassified." The passage of this uniform law in all the New England States will be another step forward in our fruit-growing industry, and I recommend its passage in this State.

Boys' and Girls' Club Work.

Owing to the demand for greater food production, boys' and girls' clubs were stimulated to a marked degree, and the following were organized: —

Club.	Enrollment.
Corn,	425
Potato,	562
Market garden,	1,085
Pig,	3,358
Poultry,	758
Canning,	3,732
Home economics,	3,095
	13,015
Home and school gardens,	109,117
	122,132

Over 4,000 pigs were distributed, and there was a marked increase in the number and membership in canning clubs and conservation clubs. The money for prizes was offered as follows: —

Washington trip
Camp week at Massachusetts Agricultural College
War saving stamps
Books
Banners
Pins
State fairs

The interest in this work seems to continue to a very marked degree, and the boys and girls of Massachusetts are being given a very definite opportunity to profit by work in agriculture.

The Fairs.

The relation existing between the Department and the Agricultural societies has been entirely changed as a result of the anti-aid amendment. The last bounty under the old fair law (Revised Laws, chapter 124) was paid in August, 1918. The societies to which it was paid and the amounts are shown in the following table: —

Name of Society.	Amount of Bounty paid, 1918.
Amesbury and Salisbury Agricultural and Horticultural Society,	$753 20
Barnstable County Agricultural Society,	1,000 00
Blackstone Valley Agricultural Society,	1,000 00
Deerfield Valley Agricultural Society,	955 25
Eastern Hampden Agricultural Society,	1,000 00
Essex Agricultural Society,	938 00
Franklin County Agricultural Society,	1,000 00
Hampshire Agricultural Society,	821 80
Hampshire, Franklin and Hampden Agricultural Society,	1,000 00
Highland Agricultural Society,	968 40
Hillside Agricultural Society,	1,000 00
Hingham Agricultural and Horticultural Society,	893 40
Hoosac Valley Agricultural Society,	747 55
Housatonic Agricultural Society,	1,000 00
Lenox Agricultural Society,	98 25
Marshfield Agricultural and Horticultural Society,	697 15
Martha's Vineyard Agricultural Society,	1,000 00
Massachusetts Horticultural Society,	1,000 00
Middlesex North Agricultural Society,	914 79
Nantucket Agricultural Society,	962 50
Oxford Agricultural Society,	951 35
Plymouth County Agricultural Society,	670 30
Quannapowitt Agricultural Society,	993 45
Union Agricultural Society,	850 40
Westport Agricultural Society,	377 35
West Taunton Agricultural Society,	377 05
Weymouth Agricultural and Industrial Society,	958 30
Worcester Agricultural Society,	1,000 00
Worcester County West Agricultural Society,	923 45
Worcester North Agricultural and Driving Association,	1,000 00
Worcester Northwest Agricultural and Mechanical Society,	1,000 00
Worcester South Agricultural Society,	1,000 00
Total,	$27,851 94

In order to allow the Department to continue the encouragement of displays of agricultural products the General Court passed an act authorizing the offering of prizes direct by the State (chapter 241 of the General Acts of 1918). An appro-

priation of $20,000 was made to carry out the provisions of this act. The law limited the objects for which the money could be offered to the following: fruit, flowers, vegetables, grasses, grains or other farm crops, dairy products, honey, horses, cattle, sheep, swine, poultry and poultry products and farm operations. As canned goods were unintentionally left out last year, I would recommend that they be included this year by an amendment to the statute.

The money was offered through the societies which were represented on the Board of Agriculture and a few other organizations which made application. The following table shows how the money was distributed in detail.

The inspection of the fairs this year has been conducted largely by members of the office force in order to get, as near as possible, a single point of view, so that definite comparison could be made between the societies looking toward a more helpful method of assistance to these organizations. As a result of this work the adoption of a more uniform premium list will be recommended to the societies, placing particular emphasis upon some specialty in each section, and it would be advisable for the Department to encourage this specialty to the limit of its appropriation.

Agricultural Prize Money, 1918.

Name of Organization.	Amount of Prizes paid by State.	Number of Winners.
Amesbury and Salisbury Agricultural and Horticultural Society,	$279 50	83
Barnstable County Agricultural Society,	649 50	113
Blackstone Valley Agricultural Society,	721 50	50
Deerfield Valley Agricultural Society,	653 50	105
Eastern Hampden Agricultural Society,	643 00	39
Franklin County Agricultural Society,	725 00	18
Greater Lynn Fair,	117 00	7
Highland Agricultural Society,	541 00	47
Hillside Agricultural Society,	686 00	123
Hingham Agricultural Society,	484 50	88
Hoosac Valley Agricultural Society,	462 50	69
Housatonic Agricultural Society,	717 00	94

Agricultural Prize Money, 1918 — Concluded.

Name of Organization.	Amount of Prizes paid by State.	Number of Winners.
Marshfield Agricultural and Horticultural Society,	$499 00	81
Martha's Vineyard Agricultural Society,	470 50	52
Middlesex North Agricultural Society,	487 00	40
Nantucket Agricultural Society,	725 00	63
Oxford Agricultural Society,	562 25	35
Plymouth County Agricultural Society,	494 25	88
Rockland Fair,	100 00	8
Union Agricultural Society,	563 00	51
Westport Agricultural Society,	271 00	84
Weymouth Agricultural and Industrial Society,	651 30	96
Worcester Agricultural Society,	254 50	20
Worcester Northwest Agricultural Society,	725 00	100
Worcester South Agricultural Society,	461 00	28
Total,	$12,943 80	1,582

In addition to the above, prizes were offered for the fairs of the Essex Agricultural Society at Topsfield, the Hampshire, Franklin and Hampden Agricultural Society at Northampton, the Worcester North Agricultural and Driving Society at Fitchburg, and the Worcester County West Agricultural Society at Barre; but all of the above fairs were canceled on account of the influenza epidemic. For this reason the total amount of the appropriation was not used. I recommend that for the coming year the appropriation to be used at the agricultural fairs be increased to $25,000.

Farmers' Institutes.

The institute work of the year was carried on as usual. There were 48 institutes held with 78 sessions, there having been more two-session meetings than ordinarily. One society held five institutes; two held four; three held three; four, two; and seven, one each. Speakers were furnished to eleven meetings held by organizations other than those represented on the old Board of Agriculture. The cost to the Department of the institutes held was $1,817.25, and the aggregate attendance

for the year, 7,403, or an average of 95 per session. The Department has already recommended the continuance of this work and the employment of some person to specially conduct it.

Exhibitions and Contests.

The appropriation for special exhibitions was used for a corn show, a dairy products show and an exhibit of Massachusetts farm products at the Maine Crop Show in Portland, and excellent photographs of the exhibit were made.

One hundred dollars in prizes were offered to the Massachusetts exhibitors at the New England Fruit Show, at Portland, Maine, but none of the money was taken up.

A comprehensive exhibit of apples, cranberries, onions and market-garden crops was prepared for the Brockton Fair, but this had to be abandoned when the fair was canceled on account of the influenza epidemic.

Twelve hundred dollars in prizes were offered for the best yields of field corn. Forty-one contestants entered this contest, but a number later withdrew or were disqualified because their fields were not of the required size. In Class A, for the best yield in a piece of from 3 to 5 acres, and in Class B, for the best yield in a piece of above 5 acres, the following prizes were awarded: —

Name.	Address.	Prize.	Amount.
Class A: —			
Parker Stoddard,	Alford,	First,	$150
Edwin L. Lewis,	Taunton,	Second,	125
H. C. Hambly,	Fall River,	Third,	100
George G. Walker,	Williamstown,	Fourth,	75
Henry McBurney,	Stockbridge,	Fifth,	60
H. P. Caldwell,	Attleboro,	Sixth,	50
Ernest Atherton,	Gill,	Seventh,	35
Class B: —			
Mount Hope Farm,	Williamstown,	First,	300
Leroy W. Luce,	West Tisbury,	Second,	200
A. M. Bardwell,	Westborough,	Third,	50
J. H. Bartlett,	Nantucket,		
Total,			$1,195

This Department should be prepared to make special exhibits at many large fairs and expositions throughout the country. We have many good products to advertise, and we should seek to place them before the people of other States; not alone to advertise the products themselves, but also to attract settlers to our State.

Erection of Massachusetts Building on Grounds of Eastern States Agricultural and Industrial Exposition.

The commission appointed by the Governor in 1917 to erect the State building on the grounds of the Eastern States Agricultural and Industrial Exposition has practically completed its work, and with the exception of a few details the building is finished.

As the grounds of the Eastern States Agricultural and Industrial Exposition were taken over by the war department, no exhibition was held this year, but it is hoped that a splendid exposition may be held during the coming year.

The building is designed on the lines of the old State House, in Boston, and the commission has expended $39,658.83 on the building to date.

Meetings of the Board.

The annual meeting of the Board was held at Boston on December 4 and 5, 1917, when routine reports were presented and regular business transacted. The Public Winter Meeting was held at the Hotel Bancroft and Horticultural Hall, Worcester, on January 8, 9 and 10, 1918. The Massachusetts Dairymen's Association, the Massachusetts Milk Inspectors' Association and the State Beekeepers' Association held their meetings with the Board, and a very good competitive corn show was held in Horticultural Hall. A Massachusetts Vegetable Growers' Association was organized at the time. The following speakers and subjects were presented at the meeting: —

Howard W. Selby, Springfield, Massachusetts, "The Value of a Market News Service to Farmers and Fruit Growers."

Leonard G. Robinson, Springfield, Massachusetts, "The Work of the Federal Land Bank."

Charles P. Holland, Brockton, Massachusetts, "Short-time Credit for Farmers."
John Burke, Treasurer of the United States, "War Loans."
Richard Pattee, Laconia, New Hampshire, "What organization has done for the Milk Business."
George M. Twitchell, Auburn, Maine, "The Significance of an Ear of Corn."
Arthur W. Gilbert, Boston, Massachusetts, "Cost of Milk Production in New England."
E. R. Root, Medina, Ohio, "Importance of Honey Production."
H. A. Harding, Urbana, Illinois, "How may the Inspector know when a Milk is Good?"
George A. Cullen, New York City, "The Relation of the Railroad to the Farmer."
Dr. Alexander Cairns of the United States Food Administration, "Feeding the Multitude."
Dean Sarah Louise Arnold of Simmons College, Boston, Massachusetts, "The American Home as related to Food Conservation."

The Summer Field Meeting was held at Danvers at the Essex County Agricultural School on August 29. The speakers were: —

Sidney B. Haskell, Baltimore, Maryland, "Green Manure Crops."
Harold F. Tompson, Arlington, Massachusetts, "Home-grown Vegetable Seeds."
H. O. Daniels, Middletown, Connecticut, "Home-grown Feeds for the Dairy Farmer."

The new Department holds regular departmental meetings on the third Thursday of each month.

Work of the Office.

The office work of the Department has been increased by the addition of the farm machinery project, the corn borer work, which has been carried on by the Nursery Inspector, and now the transfer of the apiary work to this office. Besides this, the meetings of the Soldiers' Land Commission and the Drainage Board are held here. All new work means increased correspondence, new employees and more office furniture, which further adds to the crowded condition of the Department's quarters. For a part of the past year, too, a representative of

the Bureau of Farm Management of the United States Department of Agriculture had his headquarters with us.

Miss Mary Manning resigned as stenographer on August 17, 1918, and Miss Goldie Mendelsohn was appointed in her place. Miss Jennie Todd resigned on July 1, 1918, and Miss Ethel E. Scanlan was appointed in her place.

Library.

The library privileges of the Department have been taken advantage of to a greater extent than ever before, there having been 105 new applicants. In all, 459 books were lent during the year, those on poultry, vegetable growing, fertilizers, sheep and fruit growing having had the greatest demand.

Because of a ruling of the government that periodicals were not to be sent gratis, it was necessary to expend $57.95 for subscriptions to periodicals which heretofore had been received without cost. In addition to this expenditure, $172.21 was paid out for new books and binding.

Extracts from the Trespass Laws.

Five thousand cloth posters entitled "Extracts from the Trespass Laws" were printed at a cost of $433.96, but this number was not nearly large enough to meet the demand, and an additional supply of 3,000 paper posters were printed at a cost of $15.13. Of the cloth posters there were a number of requests for more than the five copies allowed by law, and as all over this number are sold at 6 cents each, $6.54 was realized.

Legislation for 1918.

A number of important agricultural acts were passed by the Legislature of 1918. For convenience these may be grouped into two classes: (1) emergency war legislation and (2) legislation of permanent importance. Of the emergency acts, perhaps the most important was that providing an appropriation of $100,000 for the purchase of farm machinery by the Board of Agriculture. Other important emergency legislation were the acts providing appropriations of $300,000 for promoting and stimulating the production and conservation of

food products. This fund was handled by the Food Administration under the direction of the Governor and Council (Resolves, chapters 63 and 139).

Legislation of permanent nature comprised the following: an act authorizing the State Department of Agriculture to offer prizes for competitive agricultural exhibits (General Acts, chapter 241); the act creating the State Department of Agriculture (General Acts, chapter 268); an act providing a method for the co-operative drainage of swamp lands (General Acts, chapter 289); an act to reorganize the Massachusetts Agricultural College (General Acts, chapter 262); an act to reorganize the county farm bureaus (General Acts, chapter 273); an act to establish Smith's Agricultural School (Special Acts, chapter 151); and an act to provide reimbursement for owners of berry bushes which were destroyed by the State during the campaign against the white pine blister rust (General Acts, chapter 215).

A number of amendments were made to existing law. These included an increase in the fine in the apple grading law (General Acts, chapter 169); broadening of the powers of the State Nursery Inspector (General Acts, chapter 193); an amendment to the milk grading law (General Acts, chapter 220); an amendment changing the fee in the fertilizer law from a fixed fee to a tonnage tax (General Acts, chapter 220); an amendment to the law on the requarantining of animals (General Acts, chapter 39); an amendment to the law allowing prison labor to be used for agricultural purposes on county farms (General Acts, chapter 159); and amendment empowering county commissioners to appoint dog officers (General Acts, chapter 271).

The State Board of Agriculture and the State Department of Health, acting jointly, were authorized to investigate the peat deposits of the Commonwealth (Resolves, chapter 49), and a special recess committee of the Legislature was authorized to investigate the sheep industry and the agricultural laws of the State.

The following legislation which was introduced by the Board failed of passage: an act to create a bureau of markets; an amendment to the mill acts to permit the damming of streams

for irrigation purposes; an act to fix the salary of the State Nursery Inspector; and the dog law, drafted and introduced by the special commission for that purpose.

Codification of the Agricultural Law.

In this connection I wish to strongly recommend that the agricultural law of the State be codified and brought together in one uniform and consistent act. At the present time these laws are scattered through a number of different enactments and amendments, and for the sake of brevity, clearness and uniformity it would seem wise to gather all the laws relating to and enforced by this Department under one head. The Department has adopted certain principles of legislation, and in accordance with this, and in co-operation with the special recess committee, a codification has been drawn up ready for presentation to the General Court. This codification includes certain substantive changes in the law which have been mentioned elsewhere in this report.

The Department has voted that the salary of the commissioner should be fixed at $5,000, and I would recommend, further, that all other statutory salaries in the Department be abolished, leaving them to the discretion of the commissioner with the approval of the Department. This will conform to the rules for standardization of salaries which have been laid down by the Supervisor of Administration.

Publications.

The following publications were issued by the Department during 1918, and may be obtained on application to this office: —

Name of Publication.	Pages.	Number.
Agriculture of Massachusetts, 1917, Part I,	211	1,500
Agriculture of Massachusetts, 1917, Part II,	180	5,500
Report of secretary, 1917,[1]	54	500
Report of State Nursery Inspector (sixteenth annual report),	15	500
Report of State Inspector of Apiaries (eighth annual report),	14	1,000
Report of State Ornithologist (tenth annual report),	27	3,000

[1] From the sixty-fifth annual report.

Name of Publication.	Pages.	Number.
Report of Dairy Bureau (twenty-seventh annual report),	31	700
Report of Encouragement of Dairying, 1917,	13	1,000
Report of Boys' and Girls' Club Work (fourth annual report),	13	1,000
Circular No. 41, Cranberry Growing,[1]	31	1,000
Circular No. 42, The Home Vegetable Garden,[2]	18	5,000
Circular No. 50, Apple Grading and Packing,[3]	23	1,000
Circular No. 67, Market Gardening,[1]	12	1,000
Circular No. 76, The Value of a Market News Service to Farmers and Fruit Growers.	22	3,500
Circular No. 77, The Work of the Federal Land Bank,	13	3,000
Circular No. 78, Short-time Credit for Farmers,	7	3,000
Circular No. 79, What Organization has done for the Milk Business,	12	3,500
Circular No. 80, The Significance of a Kernel of Corn,	16	4,000
Circular No. 81, The Importance of Honey Production,	10	5,000
Circular No. 82, The Relation of the Railroad to the Farmer,	15	4,500
Circular No. 83, Directions for Growing Small Grains,	4	2,500
Circular No. 84, Public Markets in Massachusetts,	23	2,000
Circular No. 85, Control of Insect Enemies of Garden Crops,	26	3,000
Circular No. 86, Agricultural Statistics for New England,	15	1,000
Circular No. 87, Agricultural Legislation, 1918,	24	500
Department Circular No. 1, Back Yard Poultry Keeping,	40	10,000
Department Circular No. 2, Food, Feeding and Drinking Appliances and Nesting Material to attract Birds.	31	2,500
Nature Leaflet No. 1, Canker Worms,[3]	3	1,500
Nature Leaflet No. 5, The White-marked Tussock Moth,[4]	4	1,000
Nature Leaflet No. 8, Insects injuring Lawns,[4]	4	1,500
Nature Leaflet No. 9, Poison Ivy,[4]	4	2,000
Nature Leaflet No. 11, Quince Rust,[3]	3	1,000
Nature Leaflet No. 22, How to identify Birds,[5]	7	2,000
Nature Leaflet No. 23, How to find Birds,[4]	7	2,000
Nature Leaflet No. 24, How to approach Birds,[4]	6	2,000
Nature Leaflet No. 25, How to attract Birds,[6]	7	2,000
Nature Leaflet No. 26, The Brown-tail Moth,[4]	4	1,500
Nature Leaflet No. 29, School Gardens,[2]	6	1,500
Nature Leaflet No. 31, Crops for School Gardens,[2]	8	1,500
Nature Leaflet No. 32, Results of School Gardening,[6]	6	1,500
Nature Leaflet No. 37, How to test Seeds,[4]	3	1,500
Nature Leaflet No. 41, The European Elm-leaf Beetle,[2]	3	1,500
Nature Leaflet No. 43, The Leopard Moth,[3]	3	2,000
Nature Leaflet No. 44, Root and Cleft Grafting,[2]	7	1,500
Nature Leaflet No. 48, Apple Scab,[1]	4	1,500

[1] Second edition, revised.
[2] Third edition, revised.
[3] Fourth edition, revised.
[4] Fifth edition, revised.
[5] Seventh edition, revised.
[6] Sixth edition, revised.

Name of Publication.	Pages.	Number.
Leaflet B (Milk),	1	8,000
Leaflet C (Milk),	1	4,000
Leaflet D (Milk),	1	4,500
Leaflet E (Milk),	1	2,000
Leaflet F (Milk),	1	2,000
Leaflet G (Milk),	1	3,000
Leaflet H (Milk),	1	7,500
Leaflet J (Milk),	1	9,000
Leaflet K (Milk),	1	6,000
Leaflet L (Milk),	1	8,000
Leaflet M (Milk),	1	10,000
Leaflet N (Milk),	1	8,000
Leaflet O (Milk),	1	3,000
Leaflet P (Milk),	1	10,000
Leaflet Q (Milk),	1	5,000
Leaflet R (Milk),	1	5,000
Leaflet S (Milk),	1	2,500
Leaflet T (Milk),	1	7,500
Leaflet AA (Milk),	1	150,000
Leaflet BB (Milk),	1	150,000
Leaflet AA-BB (Milk), Italian,	1	20,000
Leaflet AA-BB (Milk), Polish,	1	20,000
Leaflet AA-BB (Milk), Yiddish,	1	20,000
Food Value of Milk,	4	105,000
Dairy Legislation, 1918,	1	200
List of Available Publications,	11	3,500
List of Institute Speakers,	31	300
Fruit as a Food Circular,	4	30,000
Directory of Agricultural Organizations,	17	200
Apiary Inspection Bulletin No. 14, Everyday Essentials of Bee-keeping.	32	2,000
Experiment Station Bulletin No. 182, Soy Beans,	10	100
Bulletin No. 5, Vegetable Growing,	193	4,000

The demand for "Agriculture of Massachusetts" for 1917 has been large, so that at the present writing the supply of Part I, of which there were 1,500 copies, has been exhausted and that of Part II greatly diminished.

Because of a ruling of the Supervisor of Administration that the lectures and discussions of the Public Winter Meeting do

not come within the annual report classification, there will be no Part II of "Agriculture of Massachusetts." These lectures and discussions, however, will be printed in separate form, as in the past.

Bulletins of Massachusetts Agriculture.

The only bulletin printed this year was No. 5, "Vegetable Growing," which is in its third edition. The articles in the earlier edition were brought up to date and the following new articles added: "Common Potato Diseases and their Control," by A. Vincent Osmun, and "Common Storage of Fruits and Vegetables," by Edward Howe Forbush.

Bulletin No. 3, "Grasses and Forage Crops," and Bulletin No. 4, "Small Fruits and Berries," are both out of print. The demand for these publications continues to be large, and new editions should be printed this year.

Legislative Appropriations.

Object for which appropriated.	Appropriation.	Used.
Administration: —		
Commissioner's salary,	$3,000 00	$3,000 00
First clerk,	1,800 00	1,800 00
Clerks,	5,800 00	5,707 20
Commissioner's travel,	500 00	457 04
Incidentals and printing reports,	8,000 00	7,972 85
Members' travel,	1,200 00	1,441 19[1]
Associate members' travel,	1,000 00	650 93
Inspection and encouragement: —		
Nursery inspection,	14,000 00	13,989 00
Apiary inspection,	2,000 00	1,828 29
State Ornithologist,	3,500 00	3,499 60
Disseminating information,	9,000 00	8,976 67
Farm machinery,	108,000 00	108,000 00
Dairy Bureau: —		
Agent's salary,	1,800 00	1,800 00
Expenses,	7,200 00	7,199 58
Encouragement of dairying,	6,946 69	2,322 68
Encouragement of orcharding,	500 00	499 01

[1] Difference advanced from deficiency appropriation.

LEGISLATIVE APPROPRIATIONS — *Concluded.*

OBJECT FOR WHICH APPROPRIATED.	Appropriation.	Used.
Bounties to agricultural societies,	$28,000 00	$27,873 19
Bounties on poultry,	3,130 00	1,661 50
Premiums to children and youths,	2,000 00	1,968 64
Special exhibitions,	2,000 00	1,997 08
Special: —		
White pine blister rust,	23,423 82	14,418 67
White pine blister rust damages,	8,000 00	6,144 35
	$240,800 51	$223,207 47

LOOKING AHEAD.

To attempt to predict agricultural conditions in 1919 is almost as futile as to attempt to predict the weather for the same period, but certain facts which always affect agricultural conditions must be taken into consideration.

Generally speaking, a period of high prices is followed by a lower level, due largely to an overproduction or poor distribution of some crop or crops. The government guarantee of a fixed price on wheat is the only thing which can save lower prices for this crop, while the other great cereals with no guarantee are bound to come down. In our own State the same is certain to be true of tobacco and apples. On the other hand, those crops which have sold below a profitable price will have a tendency upward, as there will be restricted planting until prices begin to come back. Farmers as a rule plant blindly, without the least knowledge of conditions around them or in the country. Just because onions sold very high in 1917 there has been a tendency to overplant during the past two seasons, not alone in this State but in all the onion sections. So, also, with market-garden crops, with a consequent lowering of the price.

The other big factor in the agriculture of another year is the labor situation. There can be little doubt that the labor market will be much easier than it has been for the past three years. The release of many soldiers and the closing of many

of our war activities immediately place on the market a surplus of labor which will be hard to employ at wages which will be at all satisfactory to the wage earner. Many of the men who left the farms will naturally seek to come back, and we may safely say that there will be an ample supply of help.

A great many farmers have changed over their methods so that they will not need as much help as they did before the war, but there will probably be a gradual return to pre-war conditions. It will undoubtedly be necessary to continue for a year or two under these changed conditions, for the cost of shifting back will be an expensive operation. We shall undoubtedly see quite an extension of live-stock breeding in the next few years, and this should continue, provided some adequate selling conditions can be arranged.

That there will be an expansion of agricultural activities seems almost certain. That Massachusetts and New England will raise more of its food is certainly true, but in order to do this agriculture must be better able to stand on its own feet and not look too much to government and State aid. Although these both will be necessary to a certain degree, much of the future of agriculture depends upon wise legislation. A definite program, large enough to cover a good many years of work, should be laid out and some of the details taken up each year. Massachusetts is spending each year far too much for educacational agriculture and far too little for constructional agriculture.

We are fast drifting into a state of making ourselves believe that we are doing the right thing simply because we have a lot of agencies and are spending a lot of money, while there does not seem to be any real demand for practical results. As long as this condition prevails, and as long as our people are willing to fool themselves into believing that we are accomplishing results, just so long will the real development of agriculture be retarded. The rapidly growing system of bureaucratic control of all governmental functions has extended to an alarming degree during the war, and there is great danger of its getting a permanent hold over our country unless it is checked by the wise counsel of those who see clearly the menace in this system. Its danger to agriculture is very apparent. It fastens a tax

upon the farmer and nation for a service the actual results of which are very questionable.

The fast-increasing tax rates are a matter which farmers should look carefully into, as these bear down very heavily upon our country people. The farmer's property is all in sight, and his improvements seldom fail to catch the eye of the assessor. There will be much discussion of taxes within the next few years and a probable change in our laws. Single tax will be advocated by those who believe that its operation will cure most of the ills of humanity. The graduated income tax will also be brought forward. Both these systems have points of merit. We must, however, certainly have a system of taxation that does not bear down so heavily upon improvements to our property. Labor and time-saving devices are becoming more and more essential to the farmer, yet he hesitates to put in any of these because of the danger of increasing his taxes.

One other point which bears heavily upon the future of agriculture is that of the attitude of the business man who has become interested in the farmer's problems. Far too often the farmer treats his interest as an intrusion into affairs which do not concern him; far too often the business man does not see the farmer's point of view, and there is in consequence a feeling of distrust. There should be a better understanding between business men and the farmer, for certainly their interests are very closely connected. It would seem that if these business men who are anxious to assist agriculture would recognize that there are two big factors in building up agriculture they might devise some helpful plan.

Farmers need money. There should be a more elastic system of short-term credits, and the banks should be willing to give the limit of credit to all deserving farmers, and then the bankers should go one step further, and do all they can to get the farmers' crops marketed at a profit.

In closing this report I cannot help but call the attention of this Department to the big problem of a sure development of agriculture in New England, for we here should look upon these States as a unit. We should plan for a closer co-operation between the departments of agriculture of this section, and by frequent meetings and discussions lay out a plan for the de-

velopment of this section upon broad constructional lines. Looking to the future, our plan must embrace many things to be covered in the years to come, and, by taking up some detail of it each year, we must try to build the whole structure upon a permanent basis. This plan would have to consider co-operation with the Federal government in reclamation work; the drainage of our river swamps and marshes; the building of better roads and canals; the marketing of our crops; and the co-operation of our farmers in the sale and purchase of goods. New England products should be advertised in the markets of the world, and to this end we should maintain a bureau of exhibits supported by all the New England States, and send this exhibit to all parts of the country, and, as occasion demands, to all parts of the world. Massachusetts should be the leader in this movement, and this Department has within its power the accomplishment of much that will be of agricultural value to Massachusetts and the other New England States.

In conclusion I recommend the following: —

1. That the agricultural law be codified.
2. That the feed and fertilizer control work be transferred from the agricultural college to the Department of Agriculture.
3. That all statutory salaries in the Department be abolished, with the exception of the commissioner's.
4. That the salary of the commissioner be fixed at $5,000.
5. That a division of plant industry be created to take over the present work of the Nursery Inspector and Inspector of Apiaries.
6. That certain changes in the apple grading law be made to conform with the grading laws of the other New England States.
7. That a division of markets be created.
8. That a division of reclamation, colonization and soil survey be created.
9. That a dairy division be created.
10. That the law authorizing the Department to give prizes for agricultural exhibits be broadened so as to include the products of the domestic arts.

Respectfully submitted,

WILFRID WHEELER,
Commissioner.

MINORITY REPORT.

JANUARY, 1919.

Minority Report.

To the General Court of Massachusetts.

The undersigned is in general agreement with the report of the Department of Agriculture for 1918 as prepared by the Commissioner and accepted by the associate members, but wishes formally and emphatically to record his lack of agreement with that part of the report antagonistic to home gardens.

It is, of course, essential for the prosperity of the Commonwealth that farmers should receive adequate returns for their labor. There is no one in the Department more anxious than I that they should do so. If this appears to be endangered by the home garden movement the Department should meet the situation, not by measures which will reduce production, but by such a thorough study of distribution and of markets, at home and abroad, as will enable it to advise all citizens how they may, at all times, keep every foot of agricultural land within the Commonwealth most profitably employed.

Every associate member of the Department is a public officer entrusted with the exercise of a portion of the sovereign power of the State, and represents not only the farmers but all citizens within his county. If the Department is to command public confidence this power must be exercised for the benefit of all the people.

The undersigned also wishes to go on record as not being convinced of the necessity or wisdom at the present time of increasing the salary of the Commissioner from $3,000 to $5,000 as recommended in the report and provided in the draft of the agricultural law now before the General Court.

Respectfully submitted,

WILLIS MUNRO.

Associate Member for Suffolk County,
Massachusetts State Department of Agriculture.

January 11, 1919.

FIRST ANNUAL REPORT

OF THE

SUPERINTENDENT OF FARM MACHINERY.

JANUARY, 1919.

FIRST ANNUAL REPORT OF THE SUPERINTENDENT OF FARM MACHINERY.

To the State Department of Agriculture.

CHAPTER 90, GENERAL ACTS OF 1918.

AN ACT TO AUTHORIZE THE STATE BOARD OF AGRICULTURE TO PURCHASE FARM MACHINERY AND LEASE THE SAME FOR THE USE OF FARMERS.

Be it enacted, etc., as follows:

SECTION 1. There shall be allowed and paid out of the treasury of the commonwealth a sum not exceeding one hundred thousand dollars, to be expended subject to the approval of the governor and council by the state board of agriculture in the purchase of farm machinery and in operating the same or in leasing it to farmers, for use in this commonwealth, upon such terms and for such periods as the board may deem expedient.

SECTION 2. The provisions of chapter four hundred and ninety-four of the acts of nineteen hundred and eleven, as amended by chapter two hundred and forty of the General Acts of nineteen hundred and sixteen, relating to the hours of labor of public employees, shall not apply to persons employed under the provisions of this act.

SECTION 3. This act shall take effect upon its passage. [*Approved March 23, 1918.*

Acting under authority of this act, the State Board[1] of Agriculture, in conjunction with the State Food Production Committee of the Public Safety Committee, appointed Leslie R. Smith of Hadley, Massachusetts, as Superintendent of State Farm Machinery. The project was further organized by dividing the State into four districts as follows: District No. 1, including Berkshire and Hampshire counties, with C. E. Lockwood of Hinsdale as district superintendent; District No. 2, including Worcester, Franklin and Hampshire counties, with C. C. Colby of Hubbardston as district superintendent; District No. 3, including Middlesex, Norfolk, Suffolk, Plymouth, Bristol, Barnstable, Dukes and Nantucket counties, with W. H. Pierce of Waltham as district superintendent (Mr. Pierce later resigned and the position was filled by Joseph G. Ray of Frank-

[1] Where the term Board is used, it is understood to mean Department after September 1.

lin); and District No. 4, including Essex County, with S. N. Stimson as district superintendent.

There were purchased 36 tractor units and other machinery, as per following list: —

21 Fordsons, equipped with two-bottom Oliver plows and Clark harrows.
10 Case tractors, equipped with John Deere plows and Roderick Lean harrows.
2 Heider tractors, equipped with John Deere plows and Clark harrows.
2 Parrett tractors equipped with Vulcan plows and Clark harrows.
1 Moline tractor, equipped with Moline plow and harrow.
14 McCormick cord binders.
2 second-hand cord binders that were found to be in good shape and purchased.
10 Case threshing machines.
4 Van Brunt grain drills.
2 Deere corn planters.
2 American pea and bean threshers.
1 hay baler.
1 potato planter.

As soon as possible after the passage of the act, letters were sent out to the food production committees of each city and town in the Commonwealth telling of the plans of the Board and asking if their city or town was interested. The endeavor was made to have the tractors located where there would be a minimum of 100 acres to plow and harrow, within a radius of 4 or 5 miles.

From the replies to these letters and from information received from other sources, units were finally located as follows: —

WESTERN DISTRICT.

C. E. LOCKWOOD, *District Superintendent.*

Unit Number.	MACHINES.	Location.
6	Case tractor, plow and harrow,	Lanesborough.
	Thresher, reaper and seed drill,	Lee.
	Thresher,	Lenox.
1	Case tractor, plow and harrow,	Richmond.
25	Fordson tractor, plow and harrow,	North Adams.
2	Case tractor, plow and harrow, thresher, reaper,	Williamstown.
	Hay baler,	Pittsfield.

Central District.

Chas. C. Colby, *District Superintendent.*

Unit Number.	Machines.	Location.
9	Case tractor, plow and harrow,	Hadley.
10	Case tractor, plow and harrow,	Hardwick.
11	Heider tractor, plow and harrow,	Auburn.
13	Parrett tractor, plow and harrow,	Greenfield.
14	Parrett tractor, plow and harrow,	Amherst.
17	Fordson tractor, plow and harrow,	Lunenburg.
19	Fordson tractor, plow and harrow,	Uxbridge.
20	Fordson tractor, plow and harrow,	Leominster.
27	Fordson tractor, plow and harrow,	Lancaster.
30	Fordson tractor, plow and harrow,	Spencer.
31	Fordson tractor, plow and harrow,	Southbridge.
32	Fordson tractor, plow and harrow,	Spencer.
34	Fordson tractor, plow and harrow,	Northbridge.
35	Fordson tractor, plow and harrow,	Bolton.
354	Reaper and binder,	Amherst.
355	Reaper and binder,	Williamsburg.
358	Reaper and binder,	Greenfield.
357	Reaper and binder,	Hardwick.
363	Reaper and binder,	North Brookfield.
365	Reaper and binder,	Auburn.
366	Reaper and binder,	Lunenburg.
404	Threshers, grain,	Hardwick.
405	Threshers, grain,	Greenfield.
406	Threshers, grain,	West Brookfield.
409	Threshers, grain,	Auburn.
152	Grain drill,	Hardwick.
551	Corn planter,	Hadley.
	Bean thresher,	Shelburne.

Eastern District.

Jos. G. Ray, *District Superintendent.*

Unit Number.	Machines.	Location.
4	Case tractor, plow and harrow,	Nantucket.
5	Case tractor, plow and harrow,	Franklin.
8	Case tractor, plow and harrow,	Marshfield.
12	Heider tractor, plow and harrow,	Framingham.
23	Fordson tractor, plow and harrow,	Holliston.
18	Fordson tractor, plow and harrow,	Framingham.
36	Moline tractor, plow and harrow,	Bedford.
407	Thresher,	Newburyport.
408	Thresher,	Southville.
356	Reaper and binder, McCormick,	Groton.
360	Reaper and binder, McCormick,	Franklin.
364	Reaper and binder, McCormick,	Taunton.
362	Reaper and binder, Moline,	Franklin.
367	Reaper and binder, Deering,	Bridgewater.
368	Reaper and binder, Deering,	Brockton.
	Fordson tractor, plow and harrow (leased),	Walpole.
	Fordson tractor, plow and harrow (leased),	North Easton.
	Fordson tractor, plow and harrow (leased),	Wayland.
	Potato planter (leased),	Concord.
	Grain drill (leased),	Townsend Harbor.

Essex County.

S. N. Stimson, *District Superintendent.*

7	Case tractor, plow and harrow,	Ipswich.
15	Fordson tractor, plow and harrow,	Topsfield.
16	Fordson tractor, plow and harrow,	Newburyport.
12	Heider tractor, plow and harrow,	Groveland.
22	Fordson tractor, plow and harrow (leased),	Danvers.
	Grain drill (leased),	Ipswich.

It was planned that the Board should operate the majority of the units, but that some should also be leased to responsible parties who could run them at their own expense and who could also do work for other farmers in the immediate

neighborhood. As the plan finally worked out, 26 units were run by the Board and 10 were leased.

The value of this work as a demonstration should be considered. It has proven that there is a place in New England agriculture for the tractor. There are many things that the tractor cannot do. There are many fields too wet, and others too stony, where tractor work should never be attempted. On the other hand, it has been surprising to find the rough work that some of the State tractors have done in plowing and harrowing. As a belt power for threshing, corn husking or filling silo, the tractor is excellent in every way.

The State owns five different makes of tractors, and we can say that any one of these machines will do very good work with a proper operator. In fact, here is the secret of success with the tractor. We have been asked innumerable times, "Which is the best tractor?" One of our district superintendents says "there ain't no such animal," and he is quite correct. No one of our five makes of tractors has all the good points, none all the faults; and we look for definite improvements in the next ten or fifteen years until a tractor will present no more of a problem to the operator than does the up-to-date automobile.

In buying a tractor there are several points to be considered. Any machine should show up well when new and operated by an expert, — you only find the weak points when you put the machine into hard work day after day. This brings us to the first thing to be considered in buying the farm tractor, and that is service. What is the organization behind your machine? Have they parts on hand? Are they established to give you quick and efficient service? Have they real tractor men to make adjustments and repairs? After our experience, I would say that a second-class tractor with first-class service would give better satisfaction than a first-class tractor with second-class service.

Also to be considered is the size of machine to suit the individual need and the amount of power required on your particular farm. Are your fields close together or have you long trips to make over the roads? Driving the tractor over hard roads with field lugs on will shake your machine to pieces,

and also the driver. Some special device should be furnished for road work.

At the start off we contracted to plow for $3.50 per acre and harrow for $1.50 per acre, plus the board of operator. July 1 the price was changed to $5 per acre for plowing and $2 per acre for harrowing (this meant going over the field with a wheel harrow once, on a half lap).

The threshers were operated by the State, hitching them up with a tractor for power. This part of the work was very successful. Oats were threshed at 10 cents per bushel and all other grain at 15 cents per bushel. Nearly all the other machinery, such as harvesters, binders and planters, was leased to parties who agreed to do all the work possible in their vicinity and at a reasonable price. We have reason to believe that this plan worked out very well. The one hay baler was operated by the State. A number of requests for more hay balers have been received, showing a demand especially for machines to bale straw after grain has been threshed.

Some of the Stumbling Blocks.

The act authorizing this work was approved March 23, 1918. The problem of purchasing machinery and assembling it at different points throughout the State in time for spring work was the first problem we had to contend with. This was so very difficult on account of conditions of transportation that the project was fully a month late in getting under way, and resulted not only in the loss to the farmers of the use of the machinery at a vital time, but in a loss to the Board of a lot of good work. Many of the farmers, unable to wait, plowed and fitted their better fields, and later, when the machinery was ready to go to work, we had much undesirable work to do.

The next problem which we had to contend with the whole season was that of help. There was no supply of experienced tractor drivers to draw from, and we had to pick up our men wherever we could, taking some having farm experience, some a very little machine experience, and some having neither. Some of our drivers were called in the draft after we had gotten them where they could do good work. This, as has been said

before, is the secret of successful farming by machinery. As one large farmer who has purchased a tractor has stated, "Successful tractor work depends 85 per cent on the driver and 15 per cent on the machine." And so, in answer to the many who would like to see a detailed report of each machine, as to cost and earnings, we wish to say that after all figures have been published, we would simply have the record of the driver instead of the machine. We are giving the figures regarding two of the State units, A and B. Unit A came as near or perhaps nearer to paying its way than any of our units. This is largely because of a good man who started with the machine in the spring and stayed with it throughout the season, — a man of wide farm experience who knew how to do a good job and did it. In this section you will hear much praise of the work. The fact is also true that this unit was located in a splendid agricultural section. Unit B was of different make, and was placed in a different section of the State. It has been a very expensive unit to run. We have had three or four different drivers on this unit, and it was a long way from the service station. The last move in regard to this tractor was to get a local man to drive it, and another year this unit would no doubt make a different record.

It is also true that it makes a vast difference whether or not the farmers fully co-operate in a project of this kind. If we get fields of good size, and such as can be handled by the unit to good advantage and not be too far between jobs, all these things count to make a great difference in the total work done.

UNIT A.

Paid for unit, including tractor, plow, harrow and thresher,	$2,230 75
Paid for operator's services,	$830 70
Paid for repairs, gas, oil, etc.,	$408 05
Acres plowed,	245
Acres harrowed,	35¼
Bushels of grain threshed,	6,298
Money earned,	$1,765 83

Analysis.

Total cost of tractor, plow, harrow and thresher,		$2,230 75
Total earnings,		$1,765 83
Twenty per cent for depreciation of machinery,	$446 15	
Operating and repairs,	1,238 75	
		$1,684 90
Profit,		$80 93

UNIT B.

Paid for unit, including tractor, plow and harrow,	$1,499 40
Paid for operator's services,	$310 80
Paid for repairs, gas, oil, etc.,	$1,021 68
Acres plowed,	50¼
Acres harrowed,	44
Acres harvested,	11
Silos filled,	2
Money earned,	$537 41

Analysis.

Cost,		$1,499 40
Twenty per cent for depreciation,	$299 88	
Operating and repairs,	1,332 48	
		$1,632 36
Earnings,		$537 41
Loss,		$1,094 95

In interpreting the spirit of this act, it was felt that this was a war emergency project with the paramount object of increasing the production of food, and the work was planned and carried out with this one object always first in mind, and every endeavor was made to keep the machines at work every day possible. The Board used every effort to get the machines to their destination as soon as they landed. Not daring to reship them, we used motor trucks. Much expense was incurred in moving units from one place to another when it seemed necessary, in order to help produce food. This was true of all the State machinery. Food production was *always first,* and the plan was not to help any particular farmer, not to plow a field because a man wanted it plowed nor because it was too hard for his horses. These were not important points,

but *was this work going to count in the increase of food?* So the season long, the question of expense has been subordinated to the idea of food production. We have had large repair bills in some cases, due sometimes to careless operators. Wages were high and it was economy to get as good men as possible and to pay what was necessary to keep them.

This machinery is now stored in the different towns where it was last used, and the question of what is to be done with it in the future is already coming up. It has been the endeavor of the Board to keep the machines in good repair so they can be sold and the whole project closed up, or they can be operated for the benefit of agriculture for another season. Already calls are coming in for work to be done in 1919, and many farmers have sown grain this last fall with the direct expectation of having State machines with which to harvest it.

Farm Machinery Expenditures.

Appropriation,			$108,000 00
Machinery,	$57,809 76		
Operating expenses as follows: —			
Supplies, renewals, repairs, wire, twine,	$8,862 91		
Operators' services and expenses,	18,685 15[1]		
Superintendents' salaries and expenses (general superintendent, 4 district superintendents and 1 assistant district superintendent),	11,128 59		
Gas and oil,	7,472 90		
Express and freight,	2,391 91		
Telephone and telegraph, printing, office supplies, help,	1,473 48		
Miscellaneous,	175 22		
		50,190 16	
			107,999 92
Balance,			$0 08
Unpaid bills,			$3,000 00

[1] Operators' personal injuries, $441.75.

Farm Machinery Work and Total Earnings.

Number acres plowed,	2,765
Number acres harrowed,	3,902
Number acres harvested,	1,114
Number acres corn planted,	100
Number acres potatoes planted,	35
Number tons hay baled,	351
Number bushels grain threshed,	34,596
Number pounds twine sold,	4,210

Total amount of earnings,	$26,145 03
Amount received to December 1, 1918,	$18,348 77
Machinery on hand figured at 20 per cent depreciation,	$46,248 24

Respectfully submitted,

LESLIE R. SMITH,
Superintendent.

JANUARY 16, 1919.

SEVENTEENTH ANNUAL REPORT

OF THE

STATE NURSERY INSPECTOR.

DECEMBER 20, 1918.

SEVENTEENTH ANNUAL REPORT OF THE STATE NURSERY INSPECTOR.

To the State Department of Agriculture.

The duties of the State Nursery Inspector, which are largely protective in their nature, have been confined chiefly this year to the inspection of nursery stock, the white pine blister rust and the European corn borer.

The inspection of nursery stock covers a period of nearly nine months in the field, and is very essential inasmuch as it is designed to check the spread of injurious insects and plant diseases and thereby assure the purchaser securing good stock and free from pests. The general inspection of growing stock carried on during the summer showed the nurseries to be in excellent condition. Infestations of the San José scale and oyster shell scale, as well as other nursery insects and diseases, were comparatively few and slight. In the spring all pines in Massachusetts nurseries were inspected for the white pine blister rust and the European pine shoot moth. In only one nursery was any evidence of the blister rust found. Its discovery in this nursery was perhaps to be expected, as currants infected with the disease had been previously found in its vicinity. Very few pines were found to be infected with the European pine shoot moth this year, and it is believed that the careful inspection for this pest annually has nearly exterminated it from our nurseries. The inspection of nursery stock for the gypsy and brown-tail moths revealed that the former was much less prevalent than in the year previous, and that the latter is scarcely ever met with. This decrease in the numbers of gypsy moths, while due in some degree to the extreme winter, may also be attributed to the thorough destructive treatments by our most careful nurserymen. It is hoped that Massachusetts nurserymen will take advantage of this existing

condition and by the continuance of vigorous combative measures will even lessen the disturbances of the gypsy moth in their nurseries. Not only the nursery stock but the surroundings should always be kept in mind and attended to.

During the year a limited quarantine has been placed by the State Nursery Inspector against the importation of currants and gooseberries. The object of this quarantine is not to discourage the growing of this valuable fruit in the State, — in fact we would encourage its production in certain localities, — but we do at this time wish to exclude the species of Ribes from those sections where eradication of these plants is being undertaken to prevent the spread of the white pine blister rust. Nurserymen and others wishing to import currants or gooseberries may apply to the State Nursery Inspector for a permit, which will be granted on agreement of the importer not to ship these bushes to the prohibited towns.

Requirements of the nursery inspection regulations of the States change from time to time, and nurserymen are advised of such changes whenever possible. It should be noted that the State and Federal restrictions now prohibit the movement of five-leaved pine to all States except Connecticut.

The inspection of foreign nursery stock, while conducted with the same vigilance as in previous years, required much less time than usual owing to the very material decrease in the number of shipments received. The time gained here was spent to good advantage in the inspection of interstate shipments, which were in most cases found to be of good quality and clean. During the past year only 95 shipments, consisting of 559 cases, were received from foreign countries, as compared with the 219 shipments of 1,067 cases in 1917 and 594 shipments of 5,181 cases in 1916. The following table shows the origin of this stock: —

Imported Nursery Stock, December 1, 1917, to November 30, 1918.

Country of Origin.	Number of Shipments.	Number of Cases.
Holland,	33	328
England,	32	178
Scotland,	14	18
France,	8	20
Ireland,	4	10
Japan,	2	3
Brazil,	1	1
Columbia,	1	1
Total,	95	559

The following tables enumerate the various pests intercepted by our inspectors in 1918: —

Insects found on Shipments of Foreign Nursery Stock between December 1, 1917, and November 30, 1918.

Times reported.	Name of Insect.	Found on —	Country of Origin.
1	Aulacaspis pentagona Targioni Tozzetti (white peach scale; West Indian peach scale).	Peach,	England.
1	Chilopoda (centipede),	Taxus,	Holland.
1	Braconidæ (hymenopterous parasite),	Rhododendra,	Holland.
2	Lecanium persicæ Fabr. (European peach scale).	Peach,	England.
2	Lepidosaphes ulmi L. (oyster shell scale),	Box,	Holland.
2	Notolophus antiqua L. (European tussock moth).	Rose,	England, Holland.
1	Pontia sp. (lepidopterous pupæ),	Rose,	Holland.
1	Tortricidæ (lepidopterous larva),	Pear,	France.

Diseases found on Shipments of Foreign Nursery Stock between December 1, 1917, and November 30, 1918.

Times reported.	Name of Disease.	Found on —	Country of Origin.
1	Bacterium tumefasciens (E. F. Smith and Townsend).	Rhododendra,	Holland.
2	Exobasidium sp. (exobasidium galls),	Rhododendra,	England, Holland.

One hundred and fifty-two nurseries were inspected this year and 147 certificates granted. The number of agents' licenses issued was 120, which is a slight increase over the number issued last year.

White Pine Blister Rust.

The white pine blister rust under this department, co-operating with the Bureau of Plant Industry, United States Department of Agriculture, on a dollar for dollar basis, has been carried on along the lines put into operation and recommended by Dr. H. T. Fernald, who was the State Nursery Inspector last year. In 1917 the blister rust was found present on Ribes (currants and gooseberries) in 224 towns, and diseased pines were located in 72 towns. When it was learned that the disease was so widespread throughout the State, it was thought advisable to establish control areas, which were areas where pines were especially valuable and from which it was hoped that all Ribes could be removed. Such areas were established in Warwick, Lenox, Lee, Stockbridge, Barre, Petersham, Dana, and a section comprising the towns of Hanover, Hanson, Halifax, Pembroke, Marshfield and Duxbury.

In the late fall of 1917 the cultivated Ribes were removed from the Barre and Hanover areas. From April of this year, when it was possible to go on with the work, practically all of our time has been spent in these areas in an attempt to eradicate the wild Ribes. The Barre district was a demonstration control area where various experiments relating to crew organization and methods of scouting for wild currants and gooseberries were tried. Mr. R. M. Marble had the supervision of this work. In order that the results accomplished in these areas might be protected, a quarantine has been established prohibiting the planting of Ribes in these towns.

A superintendent was stationed in Hanover, and another in Barre, whose duty it was to lay out the work, keep the maps, reports, costs, etc., also to give information to property owners and others interested in blister rust. Most of the foremen had previous experience on blister rust or similar work, while the crews were made up chiefly of young men from colleges and local help. At the height of the season, eight crews were work-

ing. Different crew organizations were tried, but the conditions and growths would not always warrant the same method. However, for most scouting, a crew composed of five men and a foreman seemed to give the best results. The crew men worked on a line about 5 feet apart, with the foreman in the rear to check up the work and keep the line.

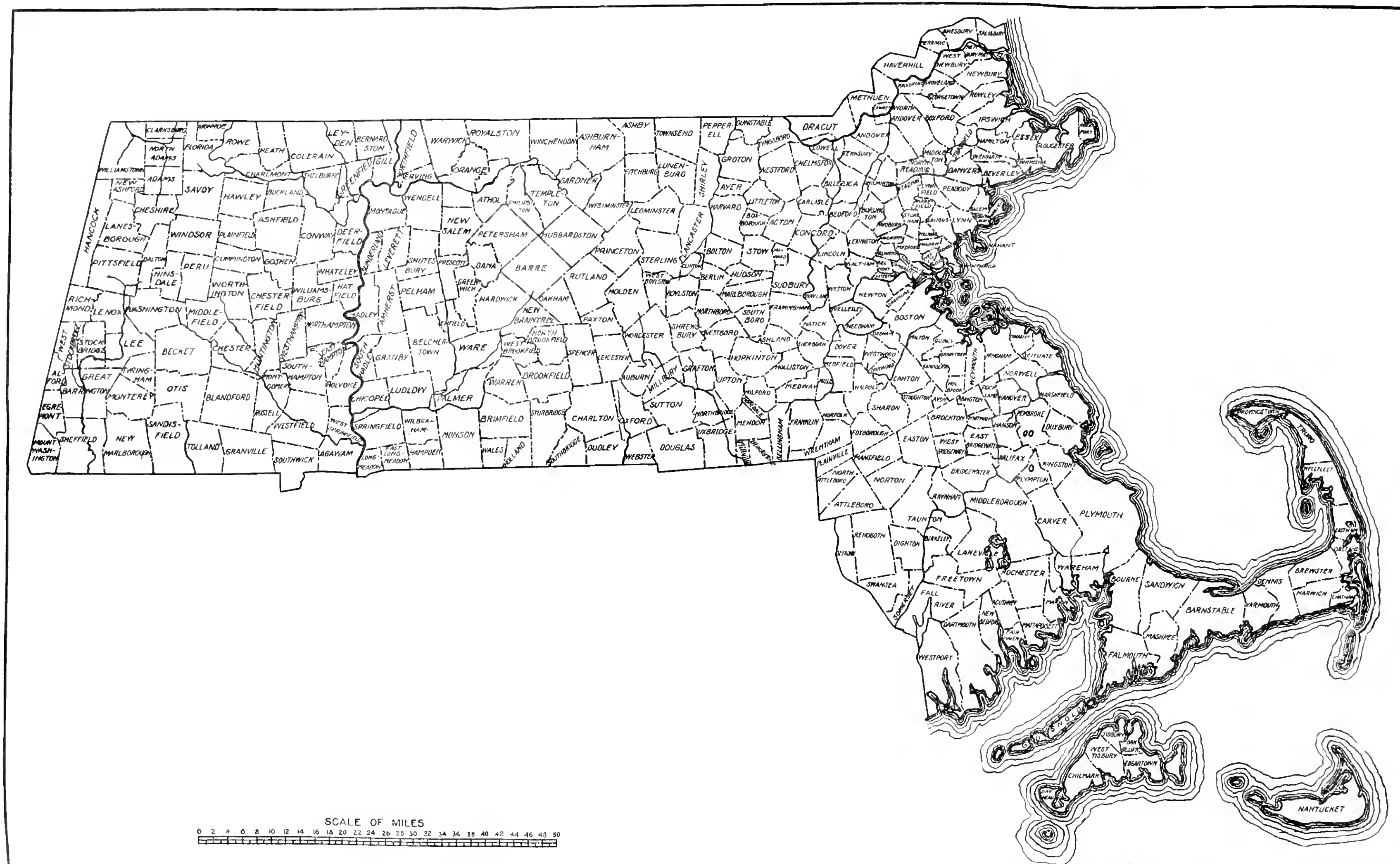
The eradication was started in Hanover and continued into parts of Pembroke and Marshfield which immediately joined Hanover, so that we have a connected area. In the Hanover district we were able to clear 6,909 acres in the town of Hanover, 1,820 acres in Pembroke, 224 acres in Halifax, and 1,658 acres in Marshfield. This totalled 10,611 acres and was completed at an average cost of 70 cents per acre. Parts of this district were very hard to cover, especially the swamps which were full of bull briers (smilax), and were quite certain to have numerous wild Ribes, while the upland growth, which was usually covered with scrub oaks and blueberry bushes, was generally free of Ribes. It would seem that with these existing conditions, certain areas in this district could be designated as Ribes-free, and it would only be necessary to scout such places as swamps, roadsides, walls, gardens, etc. A total of 110,957 Ribes were removed from this area.

Ribes Eradication Data by Areas, 1918.

	Barre and Petersham.	Hanover.	Pembroke.	Halifax.	Marshfield.	Total.
Number of acres covered for Ribes,	8,095	6,909	1,820	224	1,658	18,706
Number of man hours,	12,223	14,170	3,495	105	538	30,531
Average number of man hours per acre,	1.51	2.05	1.92	1.468	.323	1.63
Average rate of pay per hour (cents),	39.7	40.4	40.4	39.8	49.3	40.2
Total labor cost,	$4,852	$5,725	$1,413	$42	$265	$12,297
Average labor cost per acre (cents),	59.9	82.6	77.6	18.6	15.9	66
Number of wild gooseberries destroyed,	64,322	79,002	28,191	48	3,716	175,279
Number of skunk currants destroyed,	180,788	-	-	-	-	180,788
Number of cultivated Ribes destroyed,	526	815	429	1	148	1,919
Total number of Ribes destroyed,	245,636	79,817	28,620	49	3,864	357,986
Average number of Ribes per acre,	30.3	11.5	15.7	.218	2.33	19.6

In the Barre area the growth was decidedly different from that in the Hanover section. Wild gooseberries were very numerous, especially throughout the woods, while along streams and in swamps skunk and other wild currants were more abundant. This area was a demonstration area and it was intended to estimate the cost of eradication for different types of growth and to determine the efficiency and effectiveness of some selective methods of eradication. Two sections were chosen to obtain data on selective Ribes eradication. The sections were first thoroughly scouted by gridironing them at intervals of 500 feet. The crew traversed such areas as were designated by the scout as Ribes areas. Out of a total of 331 acres, but 53 acres were designated as free from Ribes. On these supposedly Ribes-free areas the crew found 686 plants, or 20 per cent of the Ribes on the entire tract, exclusive of skunk currants.

The results here showed that even with the most careful preliminary scouting, mapping all areas, such as swamps, streams, walls, etc., it would be a dangerous policy in the Barre section to omit any extensive areas, calling them Ribes-free, at least where pine is present in any great amount. It is quite possible, however, that some selective system might be adopted whereby the pine area formed a basis of selection, then establishing around it a protective area. At least two scoutings and possibly three are necessary before most of this area can be called free of Ribes. We were able to eradicate Ribes from 8,095 acres in this area at an average cost of 60 cents per acre, — 245,100 wild Ribes were removed of which 180,788 were skunk currants.


SCALE OF MILES
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
HANCOCK
PITTSFIELD
LENOX
LEE
BECKET
OTIS
SAVOY
WINDSOR
PERU
HAWLEY
ASHFIELD
CONWAY
COLERAIN
ROWE
HEATH
FLORIDA
ADAMS
CHESHIRE
DALTON
WORTHINGTON
CHESTERFIELD
GOSHEN
CUMMINGTON
WILLIAMSBURG
NORTHAMPTON
WESTHAMPTON
HUNTINGTON
CHESTER
BLANDFORD
RUSSELL
WESTFIELD
GRANVILLE
TOLLAND
SOUTHWICK
AGAWAM
SANDISFIELD
MONTEREY
NEW MARLBOROUGH
SHEFFIELD
GREAT BARRINGTON
AMHERST
PELHAM
BELCHERTOWN
GRANBY
LUDLOW
CHICOPEE
SPRINGFIELD
HOLYOKE
WILBRAHAM
MONSON
PALMER
WARE
BRIMFIELD
HOLLAND
WALES
ORANGE
ATHOL
PETERSHAM
BARRE
HARDWICK
OAKHAM
RUTLAND
PRINCETON
HOLDEN
WORCESTER
SPENCER
LEICESTER
CHARLTON
OXFORD
DUDLEY
WEBSTER
DOUGLAS
SUTTON
MILLBURY
GRAFTON
AUBURN
ROYALSTON
WINCHENDON
ASHBURNHAM
GARDNER
TEMPLETON
HUBBARDSTON
WESTMINSTER
FITCHBURG
LEOMINSTER
LUNENBURG
ASHBY
TOWNSEND
PEPPERELL
GROTON
SHIRLEY
LANCASTER
STERLING
AYER
HARVARD
BOLTON
HUDSON
STOW
BERLIN
LITTLETON
ACTON
CONCORD
WESTFORD
CHELMSFORD
DRACUT
LOWELL
METHUEN
HAVERHILL
AMESBURY
NEWBURY
ROWLEY
IPSWICH
ESSEX
GLOUCESTER
BEVERLEY
DANVERS
PEABODY
LYNN
NAHANT
ANDOVER
BOXFORD
BILLERICA
BEDFORD
LEXINGTON
LINCOLN
WESTON
NEWTON
BOSTON
SUDBURY
FRAMINGHAM
NATICK
HOPKINTON
UPTON
MILFORD
MENDON
MEDWAY
FRANKLIN
WRENTHAM
PLAINVILLE
SHARON
CANTON
EASTON
NORTON
MANSFIELD
ATTLEBORO
TAUNTON
REHOBOTH
DIGHTON
SWANSEA
FREETOWN
FALL RIVER
WESTPORT
DARTMOUTH
ROCHESTER
MIDDLEBOROUGH
RAYNHAM
BROCKTON
HINGHAM
COHASSET
SCITUATE
NORWELL
HANOVER
MARSHFIELD
PEMBROKE
DUXBURY
KINGSTON
PLYMPTON
HALIFAX
CARVER
PLYMOUTH
WAREHAM
BOURNE
SANDWICH
BARNSTABLE
MASHPEE
FALMOUTH
YARMOUTH
DENNIS
BREWSTER
HARWICH
CHATHAM
ORLEANS
EASTHAM
WELLFLEET
TRURO
PROVINCETOWN
CHILMARK
WEST TISBURY
EDGARTOWN
TISBURY
NANTUCKET

Barre Demonstration Area, 1918.

Types.	Number of Acres covered for Ribes.	Number of Wild Goose-berries.	Number of Skunk Cur-rants.	Average Number of Ribes per Acre.	Average Number of Hours Man Labor per Acre.	Average Cost per Acre.
Old pine,	340	2,630	2,659	15.5	1.2	$0 512
Young pine,	551	1,888	403	4.1	1.6	650
Mixed pine,	370	3,119	13,239	44.2	2.1	852
Hardwood,	456	1,739	12,820	31.9	1.5	681
Brush,	3,752	34,260	43,187	20.6	1.7	1 097
Swamp,	367	11,711	29,999	113.6	2.7	1 097
Skunk currant areas,	7½	255	77,575	10,377.3	33.8	13 380
Pasture,	2,251½	6,310	580	3.2	.6	258
Miscellaneous stone wall, etc.,	–	2,410	326	–	–	–
Total, all types,	8,095	64,322	180,788	30.3	1.5	$0 599

An inspection of the cultivated Ribes was made in Lenox, Lee and Stockbridge where the wild Ribes had been removed in 1917, and 256 diseased cultivated bushes were destroyed this year.

The Legislature appropriated $8,000 last spring to be used under certain conditions for reimbursing persons who lost cultivated Ribes through the action of the State Nursery Inspector. Most of the claims were submitted by parties living in the eradication areas where the bushes were destroyed in 1917. The following scale was adopted as a basis for the settlement of all claims: —

1. Fruiting plants of black, white or red currants in a good state of cultivation and care, four years or over, 50 cents each plant. (Same on gooseberries.)

2. Fruiting plants of black, white or red varieties in a good state of cultivation and care, two to four years, 35 cents each plant. (Same on gooseberries.)

3. Fruiting plants run down, depreciated by age or lack of recent care (reference had to plants capable of rejuvenation), 25 cents each plant. (Same on gooseberries.)

4. Good plants, but neglected, unpruned, in sod and uncultivated, 10 cents each plant.

A total of 253 claims for 16,517 bushes were adjusted for which compensation amounted to $5,655.05, an average of 34 cents per bush.

THE EUROPEAN CORN BORER (*Pyrausta nubilalis*).

The European corn borer which has recently made its appearance in Massachusetts presents every indication of being one of the most serious insect pests brought into this country. The importance of the European corn borer was realized last spring, and a vigorous campaign was undertaken at that time to clear up all gardens in the known infested area, which comprised the towns of Swampscott, Lynn, Saugus, Wakefield, Woburn, Stoneham, Melrose, Winchester, Medford, Malden, Everett, Revere, Winthrop, Arlington, Somerville, Cambridge, Belmont, Brookline and Boston. A careful study of the habits of the insect during the past summer has shown that we have a far more serious and a more difficult problem confronting us than was at first supposed.

From the information at hand it would seem that the European corn borer was brought into Massachusetts a few years ago, and is now firmly established in 34 towns, north and west of Boston. It is difficult to ascertain the plant or manner in which this insect was imported. In central Europe and parts of Asia where the borer thrives, its food plants are chiefly corn, millet, hops and hemp, where it often damages 50 per cent of the crop. Hemp would in all probability offer favorable conditions for its importation, and perhaps a shipment of hemp to some cordage company was responsible for its introduction.

The insect passes the winter as a caterpillar in the stalks of corn, weeds, or any plant which affords slight protection. About the middle of May the caterpillar pupates, still remaining inside the stem or stalk where it has hibernated. The moth emerges from the pupæ in about two weeks (June 1) and lays as many as 700 eggs. These are deposited on the stem and leaves of the early corn and weeds. The caterpillars from these eggs feed slightly on the surface, then immediately burrow into the tissues of the host plant, gradually reaching the larger stems as they increase in size. About the last of July these caterpillars have finished their feeding, they pupate, and early in

EUROPEAN CORN BORER

(Pyrausta nubi'alis).

Ragweed (*Ambrosia artemisii-folia*) infested with borers.

Corn stalks badly infested with borers.

Clump of barnyard grass (*Echinochloa crus-galli*) infested with borers.

Not an ear of corn was picked from this field. An average of more than 200 European corn borers to a hill made it impossible for the stalks to remain standing.

August the second generation of moths appear. These lay their eggs, this time as many as 900, which upon hatching do a vast amount of damage.

At this time the late corn is severely attacked; the moth laying her eggs on all parts of the plant, tassel, ear, leaf and stalk. These, as in the first generation, immediately burrow in, and those entering the tassel weaken it so that the wind soon breaks it over. Those attacking the ear render it unfit for eating, and, finally, those in the stalk have riddled it to such an extent that the plant collapses. In parts of the affected district, corn was so badly infested that 15 borers were taken from a single ear, and 311 borers from a hill. From the middle of May to date, 1 borer has been responsible for 315,000. Is there any question of the future of our corn crop if this pest is allowed to reach the "corn belt" and increase at the rate it has this past year?

The name European corn borer is perhaps misleading as it might cause one to believe that the borer attacks only corn. Undoubtedly it prefers corn, but oats, peppers, celery, beets, spinach, Swiss chard, potatoes, tomatoes and beans are a few of the garden crops recently found infested. In addition to its unlimited supply of food plants, we find it thrives in barnyard and foxtail grass, pigweed, ragweed, lamb's-quarters and even the common burdock; also in garden plants such as dahlias, cosmos, sunflowers and geraniums. The infestations of many insects are immediately visible either during the feeding period or while hibernating, but it is not so with this borer, which presents difficulties greater than those of any other garden pest. There is great danger from the European corn borer with its two generations, — its habit of always feeding inside where it is impossible to control it by spraying, and having an unlimited supply of food plants, — the only requirement seeming to be a stem large enough to enclose the larvæ.

Early last spring the borers were found in corn stubble, the stalks having been cut the previous fall. Strange to say the severe winter had apparently no effect on them. This stubble was plowed in as was the usual custom, and at the same time a few infested butts were buried at various depths, to learn the effect on the borer. It was found that stubble covered with 12

inches of soil proved to offer very little, if any, resistance, and within a few hours the borers had worked their way to the surface and were crawling towards new food plants. About the middle of the summer a field of barnyard grass was lying flat, every plant so badly infested and weakened that it could not stand.

It is very interesting to note that the area infested by the corn borer closely compares with that of the gypsy moth in 1900, but this comparison will be lost sight of soon unless some decisive measures are immediately taken to control it. Last spring the area infested with the European corn borer covered 100 square miles, to-day it is over 340 square miles, having been found now in Topsfield, Beverly, Danvers, North Reading, Reading, Lynnfield, Peabody, Salem, Marblehead, Swampscott, Lynn, Saugus, Wakefield, Woburn, Stoneham, Melrose, Winchester, Medford, Malden, Everett, Revere, Winthrop, Nahant, Lexington, Arlington, Somerville, Cambridge, Belmont, Waltham, Watertown, Newton, Brookline and Boston.

Co-operating with the United States government we have this fall placed men in 22 towns, and made a house-to-house canvass, requesting and compelling owners of gardens to clean them up. The way in which the people co-operated in this work has been very gratifying, but it is very important that the weeds around the gardens and the weeds in every vacant lot and roadside be cleaned.

This would be an enormous undertaking, — picture removing all the weeds in an area of 340 square miles. Even the ragweed and pigweed alone would seem like an almost impossible job, yet it appears to be only a question of whether we will stamp this pest out now, confine it while it is in a relatively small area, or allow it to spread over a large section, making the problem more difficult and causing thousands of dollars worth of damage before considering the task.

Financial Statement.

Blister Rust.

Appropriation available December 1, 1918,		$23,423 82
Expended,		14,418 67
Balance,		$9,005 15

Nursery Inspection.

Appropriation,		$14,000 00
Compensation of inspectors,	$8,371 35	
Traveling and necessary expenses,	5,344 00	
Supplies, postage, printing, etc.,	242 88	
		13,958 23
Balance,		$41 77

R. HAROLD ALLEN,
State Nursery Inspector.

December 19, 1918.

REPORT OF THE ENTOMOLOGIST.

NOVEMBER, 1918.

REPORT OF THE ENTOMOLOGIST.

To the State Department of Agriculture.

But three official reports on entomology in Massachusetts appear to have been published in the history of the Commonwealth. Dr. T. W. Harris, as a member of a scientific commission appointed by the State for a geological and botanical survey, prepared a "Report on Insects Injurious to Vegetation," which was published in 1841, in a revised form in 1852, and as a third edition, revised by Secretary Charles L. Flint, in 1862. Though this work by the father of economic entomology will always remain a monument to the memory of its author and an honor to the State which authorized it, it cannot be placed in the class of reports.

In the seventeenth annual report of the secretary of the Board of Agriculture for 1869 is an essay by Dr. A. S. Packard on "New or Little Known Injurious Insects," followed in the eighteenth report of the secretary by a "First Report on the Injurious and Beneficial Insects of the State of Massachusetts," Dr. Packard having been elected entomologist to the Board in August, 1870. A second and third of these reports followed, but for some reason they were discontinued. There have been later entomologists to the Board, but for the most part the position has been regarded as merely an honorary one and no reports have been published.

Massachusetts accordingly has nothing to show in the way of a series of reports on the insects of the State from year to year, — nothing to correspond to the long series coming from Illinois, New York, New Jersey, Connecticut and many other States, — a condition much to be regretted, as such a series would now be almost invaluable if it were in existence. Even a record of insect conditions each year, carefully worked up, would be of great use, and such a record for the year 1918 is therefore presented here.

Insects of the Year 1918.

Insect conditions appear to be closely correlated with weather conditions in many cases. The severe winter of 1917–18 apparently had considerable effect on the San José scale (*Aspidiotus perniciosus* Comst.), destroying more than the usual number of these insects and so checking them that few complaints of their injury were received last summer. The parasite of this insect (*Prospaltella perniciosi* Tower), first discovered at Amherst, and which for a time killed up to 90 per cent of the scales in some places, has become less effective, and as the other parasites do not appear to have increased in abundance, the decreased importance of the scale this past season can in all probability be considered as due at least largely to the winter.

The most serious feature of the insect situation in Massachusetts during 1918 is probably the continued activity and spread of the European corn borer (*Pyrausta nubilalis* Hbn.). This insect was discovered in the fall of 1917 in many places near Boston, tunneling in corn and other plants. It is widely distributed in Europe, where it feeds on corn, hops, hemp, millet and several kinds of grasses, and if it should spread to the "corn belt" in the United States would undoubtedly cause enormous loss.

The European corn borer is now present over more than 135 square miles of territory, mainly west and north of Boston. Numerous reports of its presence elsewhere in the State have been investigated, but the trouble in every case thus far has been due to the common stalk borer (*Papaipema nitela* Guen.). Sweet corn is practically the only kind of corn grown within the area thus far infested, but this is seriously injured. The early crop in one field in 1917 was damaged fully 20 per cent, while with the late crop the loss in at least one case that year ran as high as 80 per cent.

The insect bores in the stem of the corn, and some beginning at the internode bearing the tassel weaken this so that it breaks over. Often the stalk bearing the ear is bored into and many of the caterpillars enter the ear directly from outside, ruining it for food.

Treatment for this pest must be by a destruction of the stalks, either by burning, burying deeply or by feeding to stock. Ensilage should prove effectual. Unfortunately the insect bores in barnyard grass, pigweed and other weeds also, so that destruction of the corn stalks will fail as an entire protection.

The Federal Horticultural Board has placed a quarantine on all shipments of corn, except shelled corn, from within the present known infested area to other States. A similar action preventing shipping from within the infested area to all other parts of Massachusetts is extremely desirable in order to prevent the establishment of colonies of this pest elsewhere in the State.

During the spring and early summer the plum curculio (*Conotrachelus nenuphar* Herbst.) caused considerable injury to plums and also to apples, and in several places the work of the red bugs (*Heterocordylus malinus* Reut. and *Lygidea mendax* Reut.) was quite serious. These last-named insects as pests are rather new in Massachusetts, but have appeared in gradually increasing numbers during the last five years.

In southeastern Massachusetts, particularly in the more sandy localities, the rose bug or rose chafer (*Macrodactylus subspinosus* Fab.) was unusually abundant on grapes, roses and other plants, and everywhere it was quite in evidence. On the contrary, the elm-leaf beetle (*Galleruella luteola* Mull.), which has been almost entirely lacking in the State for several years now, was again so nearly absent as to render spraying for it unnecessary.

The apple tree tent-caterpillar (*Malacosoma americana* Fab.) is another insect from which the State was practically free in 1918, except to a slight extent in southeastern Massachusetts. This pest for a number of years was extremely abundant, reaching its climax in the western part of the State in 1913 and 1914, and in the eastern part about a year later.

The European war has led to a great increase in the number of gardens in Massachusetts, and with an unusual amount of food supply insects injurious to vegetables have been much in evidence. In June flea beetles (*Haltica* spp.) caused considerable injury to potatoes, tomatoes and beans, and early

in August they resumed their work to some extent. Cucumber beetles (*Diabrotica vittata* Fab.) were also plenty and did much damage. The Colorado potato beetle (*Leptinotarsa decimlineata* Say), though abundant in some parts of the State, was not serious in general, but the three-lined potato beetle (*Lema trilineata* Oliv.), which is rarely noticed in most years, was unusually plentiful.

In 1917 the potato plant louse (*Macrosiphum solanifolii* Ashm.) was extremely abundant, and in many parts of the State caused much loss. This year it reappeared about ten days earlier than last year, and its work was practically at an end early in August. It was very abundant in many places, though frequently of two fields quite near, one would be nearly destroyed while the other was practically untouched. Parasites were generally numerous and rendered good service.

About the first of August reports began to arrive of the defoliation of beech, maple and other trees in western Massachusetts, and an investigation was made. The insect concerned proved to be the Saddled Prominent (*Heterocampa guttivitta* Walker), which had been very abundant over much of the same territory the previous year. From reports received and visits made, the work of this insect appears to have extended about as far north as Brattleboro, Vermont, and to have extended southward through the hill towns of Franklin and Hampshire counties west of the Connecticut River about as far as Chester and Becket, and was also in evidence in a few of the towns in the eastern part of Berkshire County. It was very noticeable that the defoliation was almost exclusively on the hilltops, the valleys being practically untouched, while thousands of acres of woodland on the higher elevations were entirely stripped.

Beech and maple appeared to be the preferred food plants, but others were eaten where these species failed to furnish sufficient food for the caterpillars, and in many places only evergreens and the moosewood (*Acer pennsylvanicum* L.) retained any foliage. These, however, were absolutely untouched, no matter how famished the caterpillars were. In several cases apple orchards near woodlots where the caterpillars were abundant were also attacked and stripped.

By the 6th of August the work of these insects had reached its climax, and many had left the trees and were entering the ground to pupate. On the base of one tree where the caterpillars were rather more abundant than usual, 81 were counted in a space a foot square; and while this was more than the average for such locations, it was by no means the densest congregation of the caterpillars which was observed.

Enemies of the insect were abundant and actively attacked the caterpillars. The predaceous beetle (*Calosoma frigidum* Kirby) and the bug (*Podisus modestus* Dall.) were both seen feeding on the larvæ, and numerous parasitic flies were actively buzzing around them, but were not observed in the process of actual attack.

Many trees appeared to be dead, and while it is probable that some will recover, others are probably lost. Where trees were stripped in 1917 they were undoubtedly in a weakened condition when the severe winter followed, and these two factors together may have left them unable to live longer. Others which survived and were stripped again this year may now find this to be more than they can resist and may die also. Certainly in some of the "sugar bushes," the loss of trees will be quite heavy, particularly with those which have passed their prime, but, as a whole, the loss of a large part of the beeches and maples in the infested territory is not probable.

Whether the Saddled Prominent will reappear in 1919 cannot now be foretold. In Maine a somewhat similar outbreak lasted three years, though it was less serious the third summer, and the fourth year hardly a specimen of the insect could be found. From the abundance of enemies of the Prominent observed this year, the prospect for at least a reduction in its numbers next summer would appear probable.

The striped maple worm (*Anisota rubicunda* Fab.) was quite abundant along with the Saddled Prominent in many places, but hardly ranked as a serious pest.

About the last of July the cabbage butterfly (*Pontia rapæ* L.) was extremely abundant, and in September its caterpillars — the green cabbage worms — were more numerous than the writer has ever before observed them in Massachusetts. If

winter conditions are successfully met by these insects, we may expect them to be a serious pest next year, as few of them this fall appeared to be parasitized.

Another unusually abundant insect this year was the squash-vine borer (*Melittia satyriniformis* Hbn.), whose work became evident early in August. In one field seen by the writer, only 4 plants out of about 400 survived, and half a dozen or more larvæ were often found in a single plant.

During August in western Massachusetts the fall web-worm (*Hyphantria cunea* Drury) was unusually abundant, its webs being noticeable everywhere. This insect has not been much in evidence before this year for some time.

The house fly (*Musca domestica* L.), always abundant by September, became so early in August this year, and has appeared to be present in larger numbers than usual.

Insecticides, following other war conditions, have increased in price, and in many cases have been difficult to obtain when needed. It would seem wise to watch the markets during the present winter and take advantage of any marked reduction, in order to lay in a supply for next season.

H. T. FERNALD,
Entomologist.

ELEVENTH ANNUAL REPORT

OF THE

STATE ORNITHOLOGIST.

DECEMBER 20, 1918.

ELEVENTH ANNUAL REPORT OF THE STATE ORNITHOLOGIST.

To the State Department of Agriculture.

GENTLEMEN: — Considerable material has been gathered and tabulated during the year for publication, but owing to war demands little could be published during 1918. Again this year, as in 1917, the State Board of Agriculture had no money available for printing a leaflet for use in the schools on Arbor and Bird Day, which is now observed in the rural schools of the Commonwealth on the last Friday in April, under chapter 74 of the General Acts of 1917. Arrangements therefore were made with the Massachusetts Audubon Society and the Massachusetts Forestry Association to furnish the money required for the publication of such a leaflet. A plate was secured from the National Association of Audubon Societies of New York, and a leaflet was prepared, printed in an edition of 11,000 copies and distributed under the auspices of the State Board of Agriculture to superintendents and teachers of the rural schools.

Material in addition to that collected last year for a bulletin on methods of attracting birds was obtained, but as not all of this could be published at this time, a part of it was issued as Circular No. 2 of the State Department of Agriculture. A more extended paper in the form of a bulletin on methods of attracting birds is now in prospect. Following are the publications of the State Ornithologist for the year 1918: —

PUBLICATIONS OF THE YEAR.

Tenth Annual Report of the State Ornithologist.

A Provisional List of the Birds of Massachusetts. (Designed for the sole use of special observers appointed by the State Ornithologist.)

Arbor and Bird Day Bulletin No. 122, April, 1918. Massachusetts Forestry Association, Massachusetts Audubon Society. Prepared by Edward Howe Forbush and Harris A. Reynolds. Approved by Payson Smith, Commissioner of Education.

Department Circular No. 2, September, 1918. Food, Feeding and Drinking Appliances, and Nesting Material to attract Birds.

Hints for Out-door Bird Study, seventh edition, in four parts, revised and reprinted, as follows: —

1. Nature Leaflet No. 22, How to identify Birds.
2. Nature Leaflet No. 23, How to find Birds.
3. Nature Leaflet No. 24, How to approach Birds.
4. Nature Leaflet No. 25, How to attract Birds.

The above leaflets will not be reprinted, as it is the present policy of the Department to discontinue all nature leaflets.

A Study of Bird Distribution.

The statute under which the office of State Ornithologist was established made it a part of the incumbent's duty to study the distribution of the birds of the Commonwealth, but did not provide assistance for that purpose or sufficient traveling expenses to enable him personally to make a comprehensive survey of the bird life in the territory embraced within its boundaries. The Ornithologist has been so occupied with studies of the food and food habits of birds, and in acting in an advisory capacity to the people of the Commonwealth in matters regarding birds and their protection, that up to the year 1918 such studies as have been made of the distribution of birds were undertaken incidentally in connection with other work. As it would have been impossible under the circumstances for the Ornithologist personally to make an adequate study of the distribution of our birds in less than ten to fifteen years, the assistance of voluntary observers in many parts of the State was requested. An act passed in 1917 having given to the incumbent of this office the power to appoint unpaid observers, correspondence was begun with people known to be fitted for the task, and several signified their willingness to act. A quest for others was begun in December, 1917, in the hope that some one qualified to serve, or willing to qualify, would be found in every town in the Commonwealth. This quest has been continued up to this day. Naturalists, sportsmen and others who were well acquainted in their respective regions were appealed to and asked to send in the names of those who knew birds. In many cases correspondence was opened with postmasters, who were requested to send to the office the addresses of such persons.

All who were willing to serve as observers were supplied with check lists and asked to indicate upon them what species of birds were found in their localities, and to tabulate other definite information called for in the document. It soon became evident that some of the would-be observers were really acquainted with but few birds. One of them apparently knew the hen, the robin and the crow. Others could recognize only a few game birds. But many who had some knowledge of birds and an abiding interest in them, and who were willing and anxious to learn, to help and be helped, were placed on the list of those who would make the attempt to qualify as observers. Others whose qualifications were well known were appointed at once. In December, 1917, the beginning of our fiscal year, 500 certificates of appointment were prepared for issuance to qualified observers. Before all of these could be used the State Board of Agriculture was abolished by the Legislature, and on September 1, 1918, a State Department of Agriculture was organized to take its place. This rendered the remaining certificates worthless, and as no money was available for printing others, further appointments will be delayed until next year, but there are now nearly 300 names upon our list of observers.

A study of distribution necessarily also implies a tabulation of migratory movements, since most of the birds of the Commonwealth are species that come from the south to breed here in summer, or come from the north in autumn to escape here the rigors or privations of winter in more northern regions. Others extend or contract their range from time to time, according to their numbers, and come here when their numbers increase, and as their numbers decrease they become rare or disappear. Others merely pass through our territory on their way north or south. Therefore a large part of the records of distribution are in fact those of migration, as many species make but a brief sojourn here. Mr. Harry S. Hathaway of Providence, Rhode Island, expressed the wish that a bureau of information could be established, by means of which the southward movement of birds could be observed by those living to the north and the facts transmitted in advance to those living farther south, and vice versa. This excellent suggestion

was adopted immediately and put into practical operation. It is easy to see the advantage thus to be obtained toward securing adequate records. For example, a rare species migrates into this region in winter. Some of the few observers who are out and about at that time of the year may see it, and two or three may make some permanent record of the fact in some ornithological periodical, but no adequate record of any large, widespread movement of the species into this region is preserved. If, on the other hand, observers in the north report to a central authority that the species is on the way, and a large number of watchers here are notified to be on the lookout for it, and report, a much more adequate record of the movement and of the sojourn of the species while here can be made.

To facilitate this work and interest our accredited observers, a number of ornithologists to the north and south of Massachusetts were enlisted, and all, both here and in other States and provinces, were requested to report on the movements of birds in their regions monthly at least, and oftener if possible. The results of these observations were tabulated by the State Ornithologist, and on the fifteenth day of each month a bulletin containing the principal facts about the movements of species was manifolded on a duplicating machine and sent to each observer. This method has brought out much useful information regarding distribution and migration. Also many interesting facts, some of them new, relating to the habits and food of various species have been obtained by observers, and recorded at the office.

Already the Massachusetts correspondents are so widely distributed that they cover the greater part of the State, but more are needed on Cape Cod and west of the Connecticut River. The war has interrupted the work in some sections, particularly on the Cape, as it has taken some of the most active and interested young men. But when the war is over this condition should be remedied, although a few have gone, never to return. Eventually, and largely as a result of this work, it should be possible for the present incumbent of this office, or his successor, to present for publication a complete annotated list of the birds of this Commonwealth, giving in full the distribution of each species.

The thanks of the Ornithologist are due to the earnest and altruistic helpers who are giving their time and means to the collection of the data for such a report. They have devoted much care and thought to the work, and the Commonwealth does not even furnish them postage stamps.

Personal visits from this office were made during the year to parts of Franklin, Worcester, Norfolk, Plymouth, Barnstable and Dukes counties, and many notes were taken on the distribution of birds in these localities. Mr. J. A. Farley, an ornithologist of many years' experience, accompanied the State Ornithologist on a tour in Franklin County, and some interesting discoveries were made regarding the distribution of species in the breeding season.

Co-operation with the Commissioners on Fisheries and Game.

During the year the Ornithologist has co-operated with the Commissioners on Fisheries and Game, advising in regard to men or means for the protection of the heath hen and the colonies of sea birds along our coasts. At the request of the commissioners he has suggested places suitable for feeding wild fowl in severe winter weather. The commissioners themselves will report on these matters, therefore it is unnecessary to duplicate their report here. In pursuance of these objects, visits have been made to various localities along the coasts.

The Heath Hen.

Again, as in three previous years, a census of the heath hen on Martha's Vineyard was taken in April. This showed approximately a 40 per cent increase in the number of the species over those of last year. On April 20, 1918, the count showed 155 birds, and some may have been overlooked. Some of these birds bred well, and probably under improved conditions the increase will continue. The commissioners have sought expert advice, and have placed a superintendent in charge of the heath hen reservation, whose entire time is to be devoted to looking after the welfare of these birds.

Under authority of the Secretary of Agriculture at Washington, Dr. A. K. Fisher, in charge of economic investigations for

the Biological Survey, visited the reservation on May 6, in company with the State Ornithologist, to examine the ground and make recommendations regarding means for increasing the species.

At the request of this office Mr. Norman McClintock came from Pittsburg, Pennsylvania, and in company with the Ornithologist visited the reservation and made motion pictures showing the wonderful posturing of the species in its mating dance. Thus the most characteristic attitudes of this bird will be preserved for future generations even if the race should become extinct.

Legislation.

Owing to the demands of the war and the preoccupation of legislators and people generally in pressing war measures, it did not seem wise to propose any new State legislation regarding birds in 1918.

International Bird Protection.

The principal influence exerted from this office regarding legislation was put forth in behalf of the migratory bird treaty act, which was first introduced into the Congress of the United States in 1917 for the purpose of putting into effect the treaty between the Federal government and Great Britain, under which it was purposed to protect migratory birds uniformly throughout the United States and Canada. This treaty had been ratified in 1917, and Canada had already put its provisions into operation, but our Congress had failed to pass an act to enable the Biological Survey to enforce the provisions of the treaty in the United States.

As nearly all Massachusetts birds are migratory, it became imperative for Massachusetts people interested in Federal and international protection of migratory birds to use such influence as they possessed with Congress to secure the passage of this bill, for by its enactment we could provide far-reaching protection in other States for many of our own useful birds, and also avoid any international unpleasantness which might result from the failure of our government to keep its engagements with a friendly foreign power. Action on this bill and many others had been delayed by imperative war matters which had pref-

MATING DANCE OF THE HEATH HEN.

Two upper photographs by Norman McClintock; next on left by Dr. G. W. Field; the rest by the State Ornithologist. (See page 101.)

erence over all other legislation. The Secretary of Agriculture at Washington appointed the State Ornithologist of Massachusetts as a member of a national advisory committee, whose duty it is to pass upon the proposed regulations for the protection of migratory birds under the treaty. The Ornithologist was also a member of the advisory committee appointed to consider tentative regulations under the Federal migratory bird law. The committee was called to Washington on May 15 to consider some proposed new regulations, and the State Ornithologist with other members of the committee and others interested called on Chairman Pou of the House committee on rules, and urged that his committee grant a special rule under which the migratory bird treaty act could be brought before the House. Other members of the rules committee were interviewed as well as some members of the House, who though not members of the committee on rules were interested in the passage of the act. Three days later the rules committee by unanimous vote granted a special rule for the consideration of the matter by the House of Representatives. This rule was introduced as soon as the business of the House permitted, and on June 6, after a debate lasting parts of two days, the bill was passed by a large majority. There was some delay in the Senate, but on June 28 both House and Senate took final action, and later President Wilson signed the bill. Under this act migratory birds passing through the United States and Canada will receive practical and uniform protection in certain tracts or zones in both countries, provided sufficient appropriations are made for its enforcement. The next step will be to secure an adequate appropriation from Congress.

Educational Work.

The educational work of the past year has consisted largely of lectures and correspondence. There are now so many calls on the Ornithologist that he has practically no time for lectures, but twenty-six talks and lectures were given during the last year before various organizations, all lectures being free to the public.

Educational Correspondence.

The demand for information received at the office constantly increases. The correspondence this year has almost doubled over that of last year. Many queries come by mail, telephone or by word of mouth. Almost every question that one can imagine regarding birds has been asked during the past few years. The requests for information that have been received during the year may be classified under the following heads: —

1. Requests for literature on birds or lists of good bird books, nature leaflets, State or government bulletins, books on birds published by the State Board of Agriculture, and calls for information about leaflets, etc., published by the Audubon Societies, ornithological magazines, etc.

2. Requests from school superintendents or teachers for advice and material regarding bird study for use in instructing teachers and pupils in the public schools.

3. Queries about the utility of birds, their food, their relations to mammals, plants, insects, rodents, fishes, etc.; their value to the farmer, forester, and the people at large; their relation to the high cost of living; their help in winning the war, etc.

4. Questions regarding the protection of birds; causes of their increase or decrease; laws for bird and game protection; measures for protecting birds around the home, or in sanctuaries or reservations; the native, natural enemies of birds; introduced enemies, means for the destruction of enemies, etc.

5. Queries about methods of attracting birds, such as feeding birds, kinds of food, plants attractive to birds, putting up bird houses, furnishing nesting material, trimming or arranging trees and shrubs to furnish proper sheltered nesting places.

6. Inquiries about means of protecting crops and fruits from birds, about scarecrows, repellents, fences, nets, etc.

7. Interrogations about the distribution of birds, scarcity or abundance, increase or decrease of certain species locally, and one season with another, etc.

8. Queries in regard to identity of birds and birds' eggs; new birds seen and described, what they are, etc.

9. Applications for employment in connection with ornithology; requests to recommend men capable of caring for bird reservations, game farms, etc.

10. Requests from authors to read and correct manuscripts of books and papers on the protection of birds, or local lists of birds.

11. General and miscellaneous questions from people of all classes, as to the number of birds in the world, nation or State; questions regarding

the age, feathers, moult, bill, claws, color, anatomy, digestion, sight, hearing, smell, migrations, habits, instincts and intelligence of birds; the folk-lore of birds, legends of birds; the effect on birds of spraying and trimming trees, cutting underbrush, etc.

All these questions are answered if possible, although in exceptional cases it takes hours to look up the references and typewrite the answers.

Bird Day Exercises.

For several years it has been customary for the State Board of Agriculture to join with the Massachusetts State Grange and the Massachusetts Audubon Society in holding bird day exercises in different counties of the State. This year the meeting was held in Chelmsford, Middlesex County, at the invitation of Mr. Walter K. Putney, superintendent of schools of that town and a member of the committee for the protection of birds of the Massachusetts State Grange.

There was a large gathering of people, particularly teachers, academy students and public school pupils. Included in the exercises was a contest in identifying fifty species of stuffed birds, also a bird-house contest. Mr. Raymond J. Gregory of Princeton, chairman of the State Grange bird committee, presided, and the speakers were Dr. S. C. Ball of the Massachusetts Agricultural College, on "How to identify Birds"; Mrs. E. O. Marshall of the State Grange bird committee, on "Bird Study"; the State Ornithologist, on "Value of Birds to the Farm and Home"; Mr. Winthrop Packard, on "Bird Welfare"; and Worthy Lady Assistant Steward of the State Grange Margaret A. Sarre, who represented Mr. Leslie R. Smith, Master of the State Grange, who was unable to be present. The exercises of the day were closed by Edward Avis with an entertainment, lesson and contest. He analyzed and imitated the music of twenty species of birds. Papers were passed for the contest, when he again imitated the birds and Mr. Putney accompanied him with a story of a bird walk, describing the habits of the birds whose notes were imitated. Some of the children were able to identify every bird by its note.

Bird Houses raided by Cats.

The experimental work on bird houses at Wareham was interrupted in 1918 by cats. Until this year apparently vagabond cats had not learned to climb much to the nesting boxes, which were mounted on rather slim poles or posts, but last June when the young birds had hatched out, and when for a time the boxes were not watched, cats began to climb them. When the poles were examined later, claw marks showed where some of them had been climbed seven or eight times, and the inmates of more than thirty bird houses were probably attacked at night. Some of the parent birds were found dead in the boxes with their heads crushed in, and the remains of others were found where their bodies had been eaten. Eggs were found broken or decayed. As a result of this raid only three or four families of tree swallows and one of bluebirds were reared in 1918, where hundreds of young birds of five species had been raised in previous years. The colony was almost wiped out. Next year each nesting box will be protected by one or more rows of large fish hooks fastened around the pole with the points downward. This seems the only means of keeping cats away that is both effective and inexpensive for a large number of poles.

A Directory of Collections of Mounted Specimens or Skins of Birds in Massachusetts available to Students.

One of the most important things for the student of birds to know is where he can see prepared specimens of the birds that he wishes to study. A colored plate is a useful method for identifying birds, but it has some drawbacks, and the bird student or would-be ornithologist cannot advance very rapidly without some use of specimens. The number of adequate collections of native bird skins and mounted birds in Massachusetts is not very large, but there are small collections in various institutions which may be made use of either by the public or by students. Also there are private collections that may be used under certain conditions. During the past two years efforts have been made to secure information about all

such collections in this Commonwealth, with a view to making them available so far as possible to those living nearest each collection. The following list has been prepared for the use of students and the public, and gives such details as could be obtained in regard to each collection: —

Barnstable County.

City or Town.	Name or Place of Collection.	Conditions.
Hyannis,	State Normal School,[1]	Students only.

Berkshire County.

North Adams,	State Normal School,[1]	Students only.
Pittsfield,	Berkshire Athenæum and Museum.	Public: 10 to 5 every day.
Williamstown,	Williams College,	Public: 8 to 4, every day but Sunday.

Bristol County.

Fall River,	Natural History Society, Y. M. C. A. Building.	Public: 10 to 10, when room is not in use.
Norton,	Wheaton College,	Public: Saturday afternoon, 1 to 6; other days by appointment.
Taunton,	Bristol County Academy of Sciences, Spring Street, A. C. Bent, president.	Public: Wednesdays, April 1 to November 1, 2 to 5; at any time by appointment.

Essex County.

Amesbury,	Amesbury and Salisbury Natural History Society, Public Library Building.	Public: 2 P.M. until darkness each day, except Sunday.
Bradford,	Bradford Academy,[2]	Open to those interested in birds.
Danvers,	Historical Society Museum, Peabody Institute Library.	Public: Mondays, Wednesdays, Fridays and Saturdays, 2 to 8.
Lawrence,	Lawrence Natural History Society, Central Building, Essex Street.	Public: every Saturday from 2 to 5.30.
Salem,	Peabody Museum of Salem, 161 Essex Street.	Public: week days, 9 to 5; Sundays, 2 to 5 in summer, 1 to 4 in winter.

Franklin County.

East Northfield,	Northfield Seminary,[2]	Public: daily 9 to 5, except Sunday.
New Salem,	In old Academy Building now used for library.[2]	Public: small collection; key in custody of Mrs. E. O. Marshall.
Northfield,	Mount Hermon School,	Public: morning and afternoon.

[1] The collections in the State normal schools are small and are maintained for the use of the pupils and teachers. In some cases other students may have access to them by special arrangement with the principal.

[2] These are small collections.

Hampden County.

City or Town.	Name or Place of Collection.	Conditions.
Springfield,	Springfield Museum of Natural History, 195 State Street.	Public: every day except Fourth of July, Thanksgiving and Christmas; 1 to 5, September 22 to March 20; 2 to 6, March 21 to September 22, also Saturday, 9 to 2.
Springfield,	International Y. M. C. A. College, Alden and Hickory streets.[1]	Public: 7.30 A.M. to 9.30 P.M.
Westfield,	State Normal School,	Students only.

Hampshire County.

Amherst,	Amherst College Museum,	Public: every day, except Sunday.
Amherst,	Massachusetts Agricultural College, Entomology-Zoölogy Building.	Week days, 1 to 5; other days, except Sunday, by appointment.
Northampton,	Smith College,	Public.

Middlesex County.

Cambridge,	Museum of Comparative Zoölogy, Oxford Street.	Public: daily, 9 to 5; Sundays, 1 to 5; not open Christmas and Fourth of July; November, December and January hour of closing, 4.30.
Cambridge,	Private collection of William Brewster, 145 Brattle Street.	By appointment on most week days from November 1 to April 1.
Concord,	Thoreau Museum of Natural History, Reginald Heber Howe, curator, Middlesex School.	Public: every day from opening to close of school; in summer by appointment, 8 to 9 P.M.
Framingham,	State Normal School,[2]	Students only.
Groton,	Groton School,	Public: school hours.
Lowell,	State Normal School,[2]	Students only.
Marlborough,	Society of Natural History, Mechanic and Witherbee streets.	Public: fourth Tuesday of each month, 2 to 5 and 7 to 8; also by appointment.
Natick,	South Natick Natural History Society, Bacon Free Library.	Public: Wednesday and Saturday afternoons, 3 to 5.30.
Newton Center,	Private collection of Frederick H. Kennard, 246 Dudley Street.	By appointment to people interested in birds.
West Newton,	Private collection of C. J. Maynard, 447 Crafts Street.	By appointment only to teachers and students, Wednesday, Thursday or Friday afternoon.
Woburn,	Public Library,	Public: 3 to 4 every week day.

Norfolk County.

Brookline,	High school,	Public: by request.
Brookline,	Private collection of Nathaniel Francis.	Public: can be seen at any time.
Franklin,	Dean Academy,[1]	Students only.

[1] These are small collections.

[2] The collections in the State normal schools are small and are maintained for the use of the pupils and teachers. In some cases other students may have access to them by special arrangement with the principal.

Plymouth County.

City or Town.	Name or Place of Collection.	Conditions.
Bridgewater,	State Normal School,[1]	Students only.
Marion,	Marion Natural History Society, Public Library Building.	Public: Saturday afternoons.
Plymouth,	Old Colony Natural History Society.	Open to the public formerly, but not now; may be reopened later.

Suffolk County.

Boston,	Boston Society of Natural History, Berkeley, corner of Boylston Street.	Public: 9 to 4.30 on week days; Sunday, 1 to 4.30.
Boston,	Boston Normal School,[1]	Students only.
Jamaica Plain,	Children's Museum, Olmstead Park, Forest Hills Street and Peter Parley Road.	Public: week days, 9 to 5; Sundays, 1.30 to 5; closed Thanksgiving and Christmas.

Worcester County.

Fitchburg,	Public Library Museum,	Public: 9 to 5 week days; 1.30 to 5 Sundays; closed Fourth of July, Thanksgiving and Christmas.
Lancaster,	Private collection of John E. Thayer, Thayer Station.	Public: Monday, Wednesday and Saturday, 8 to 12 and 1 to 5.
Leominster,	Public Library,	Public: 9 to 9 week days; 1 to 9 Sundays and holidays.
Lunenburg,	Private collection of Clayton E. Stone, High School Building.	Public: can be seen at any time.
Worcester,	Green Hill Park (collection of birds of Worcester County).	Public: 2 to 5 every day from May to October; rest of year by appointment.
Worcester,	Worcester Natural History Museum, 12 State Street.	Public: 9 to 12 and 2 to 5 every week day; not open Sunday.
Worcester,	State Normal School,[1]	Students only.

[1] The collections in the State normal schools are small and are maintained for the use of the pupils and teachers. In some cases other students may have access to them by special arrangement with the principal.

An Inquiry regarding the Decrease of Upland Game Birds.

Again as in 1907 there has come about an exceeding scarcity of game birds, due mainly, it is believed, to two bad breeding seasons, and also to an increase of their natural enemies, especially during the winters of 1916–17 and 1917–18. Goshawks, horned owls and snowy owls probably were driven south in great numbers by a scarcity of rabbits that prevailed in the Hudson Bay region during the two winters in question. They came here hungry and decimated our diminishing stock of bobwhites and grouse. Many grouse were reported killed by foxes during the winter. An inquiry was instituted regard-

ing the prevalence of foxes and it was learned that they were unusually abundant over most of the State. In order to determine whether they had migrated here from other States, inquiries were sent to all the New England States, with the result that foxes were reported numerous in all of them. It may be that foxes came into New England from the north during the winter, but we have no evidence to that effect. The only movement of foxes that this investigation discovered, if indeed it can be called a movement, was an influx of southern gray fox into western Connecticut and western the Massachusetts, where it was formerly believed to be rare but where it seems to have increased much in numbers within the last few decades, and particularly in recent years.

In the course of the inquiry regarding foxes it developed that an increase of wildcats also had occurred, and that excessive numbers of wild or vagrant house cats were roaming the woods and fields. It was reported that there were many weasels in some sections. The increase in the numbers of foxes, cats and weasels is due largely to an excess of field mice and wood mice, which have become unduly destructive to orchard trees and crops in many localities. These mice form the principal food of foxes, cats, weasels, hawks and owls. The increase of mice is no doubt due to the destruction of our native hawks and owls by gunners and game preservers, as these birds are the greatest natural enemies of mice and also of weasels. Given sufficient food, foxes are so sly and cautious that they will increase anywhere unless caught up by skillful trappers. Such trappers are few and our laws do not encourage their work. Probably also the war has decreased the number of trappers. The protection and increase of deer are responsible indirectly to some extent for the increase of foxes and wildcats. Many fox hounds will follow the fresh trail of a deer. This is an unlawful act which subjects the owner to a fine, and many fox hunters therefore will no longer pursue foxes or wildcats.[1] Domestic cats running wild are rarely hunted, although some are treed and shot by gunners and raccoon hunters in the woods. The cat is supposed to be a domesticated animal, and this is a presumption which protects it. Under our present laws there is no way of distinguishing the ownerless cat from the domestic

[1] The wildcat referred to here in all cases is the bay lynx.

pet. All the above mammals destroy grouse on or under the snow in winter, at a time when the numbers of these birds have been reduced by shooting and when such destruction counts heavily. All these enemies also hunt young birds. The cat is particularly destructive to the bobwhite, but also kills grouse in winter, and catches the old bird on her nest.

It would be well now if measures to decrease the number of foxes and vagrant cats could be taken, but it seems probable that when our boys come home from the war the high price of fur will encourage them in hunting and trapping cats and foxes and so tend to reduce the numbers of these animals.

Another cause of the lessening of the numbers of grouse and bobwhites was the severe winter of 1917–18. Numbers of these birds were found dead during the winter and early spring. It is difficult to starve a grouse, and probably these birds perished either from severe cold or from long imprisonment under a thick crust of snow. Crust is much more fatal to the bobwhite than to the stronger, hardier grouse. An inquiry was made during the spring of 1918 to determine how much the breeding stock of upland game birds had been depleted. Questionnaires were sent out into every county of the Commonwealth. The replies received may be tabulated as follows: —

Ruffed Grouse.

Rare or decreasing — 75 reports.
Number unchanged — 15 reports.
Common or increasing — 15 reports.

Local Breeding Woodcocks.

Extirpated — 17 reports.
Decreasing — 46 reports.
Number unchanged — 6 reports.
Increasing — 7 reports.

Flight Woodcock from the North.

Decreasing — 58 reports.
Number unchanged — 5 reports.
Increasing — 8 reports.

Bobwhites.

Reports show that the bobwhite has disappeared entirely from large sections of the State, but has increased locally in some of the southeastern parts.

The figures given above do not give any adequate idea of the scarcity of game birds, particularly of the ruffed grouse, over a large part of the State. Still there were localities where the species was still present in almost normal numbers, and it was hoped that a propitious breeding season would replace to some extent the recent severe losses. A watch was kept during the season. The weather was seen to be generally favorable. Many large broods were hatched and reared, passed the usual danger stage and then, as our reports show, something happened to them. In most parts of the State only a few adult birds remained alive when the hunting season opened. Many local hunters refrained from shooting grouse during the season. It is said that the birds were hunted and shot principally by automobile parties from the larger centers, and in many localities the numbers of ruffed grouse in the State appeared to be less than ever before. The present scarcity of ruffed grouse extends from New Brunswick south to Pennsylvania, and from Maine as far west at least as Michigan, even to Minnesota, although there are some localities within this region where the decrease is not very noticeable. The decimation of the grouse in 1907 extended over New England, southern Canada south to Pennsylvania, and as far west as Minnesota. As the region subject to these two visitations is nearly identical it seems worth while to make a few comparisons.

An inquiry into the scarcity of grouse in 1907 showed (1) that the birds had been decimated during the winter of 1906–07 by a great flight of goshawks, the largest since 1870; (2) that foxes were exceedingly numerous and destructive; (3) that some birds were destroyed by the cold of an unusually severe winter; (4) that a cold, late, wet spring killed off some of the incubating females and most of the young birds; (5) that some epidemic (disease or parasite) probably decimated the young even after they were half grown and also killed some of the full-grown birds. The most destructive of these factors was believed to be the exceedingly cold, wet spring which, succeeding a hard winter, reduced the vitality of the parent birds and cut off the normal increase.

If a single hard winter, with numerous foxes and goshawks, followed by one unsuitable breeding season can produce a

dearth of grouse such as occurred in 1907, immediately after a year when the birds were unusually abundant, what can be expected now as a result of one cold, wet breeding season followed by a great flight of goshawks, succeeded by another bad breeding season, followed again by a very severe winter, with another great flight of goshawks and one of horned owls, an abundance of foxes, an increase of wildcats and weasels, followed in the succeeding summer by some unknown agency which apparently destroyed the young when half-grown. When we consider the lawbreakers, who shoot more or less at all seasons of the year, it is a wonder that there are any grouse left, to say nothing of bobwhites, woodcock and pheasants.

The bobwhite succeeded better than the grouse in rearing its young. Woodcock increased somewhat in the western part of the State, but the reports from eastern Massachusetts are pessimistic. A large flight of woodcock passed through western Massachusetts in October, which may indicate that in some parts of northern New England and Canada the species bred well. The result of the investigation in Massachusetts, however, is not encouraging and indicates the necessity for more protection for upland game birds.

Recommendations.

The scarcity of game birds calls for some legislative action. The woodcock, however, now has better protection throughout the country under the regulations of the Federal government than it has had in the past, and if this protection proves insufficient the shooting season no doubt will be further abridged by the authorities at Washington. The bobwhite, like the pheasant, may be reared in numbers on game farms or preserves, and therefore is not in any immediate danger of extinction, but the ruffed grouse does not lend itself to artificial propagation on a large scale. Also, like the bobwhite, it is a non-migratory bird, and as it devolves on each State to protect those within her borders, the adult birds now left here must be saved by the people of Massachusetts and allowed to breed. They are not immortal, and, unless they are given a chance to produce young, they will soon die off and the species will disappear from our covers.

A Close Season on Ruffed Grouse.

It is recommended, therefore, that legislation be enacted prohibiting the pursuit, taking or killing of ruffed grouse within the limits of this Commonwealth for at least one year.

Adequate Provision for a Bird-day Leaflet for the Public Schools.

In the bill presented by the State Board of Agriculture in 1917, entitled "An Act to establish Arbor and Bird Day," it was made the duty of the Board to publish annually a leaflet relative to trees and birds, and an appropriation was provided for printing that publication. This bill was changed in committee, and as finally enacted section 2 of chapter 74 of the General Acts of 1917 reads as follows: —

SECTION 2. The state board of agriculture may publish annually a leaflet relative to trees and birds which shall be approved by the commissioner of education, and may distribute the same to superintendents and teachers of the rural and suburban public schools of the commonwealth prior to Arbor and Bird Day. The expenses of such publication and distribution shall be paid out of the annual appropriation for disseminating useful information in agriculture.

This act has been in force for two years, and in neither of those years has any money been available from the dissemination fund for the publication of this leaflet. It would not have been published had not the Ornithologist succeeded in securing the money from other sources. It is respectfully submitted that if this act is to have any effect in the rural schools, the publication of a bulletin or leaflet for distribution among them must be made mandatory, otherwise the act should be repealed. Unless something is published and distributed through the superintendents to the teachers to remind them of the observance of the day and to suggest some kind of a program having to do with tree planting and bird welfare, very few will take the trouble to prepare any exercises regarding these subjects for their pupils on that day. Some of the city schools include in their curriculum some instruction in these matters. In many rural schools where such exercises are most needed, and may be most readily illustrated by living examples, there is

little such instruction, if any. Many States issue elaborate bulletins, some with many colored plates, annually to all the schools on Arbor and Bird Day. Massachusetts practically leaves the whole matter to individual effort, which never can be depended upon for continuous service during a long period of years. As the law now stands it accomplishes nothing. It merely encumbers the statute books. There is never likely to be money set aside from the fund for disseminating useful information for the purpose of publishing this leaflet, and the Department of Agriculture is not required to publish it. It is therefore recommended that chapter 74 of the General Acts of 1917 be so amended as to make mandatory the preparation and publication of such a leaflet and to provide means for its publication.

EDWARD HOWE FORBUSH,
State Ornithologist.

DECEMBER 19, 1918.

NINTH ANNUAL REPORT

OF THE

STATE INSPECTOR OF APIARIES.

DECEMBER 1, 1918.

NINTH ANNUAL REPORT OF THE STATE INSPECTOR OF APIARIES.

To the State Department of Agriculture.

After one of the most severe winters ever experienced in eastern United States, the conditions in apiaries this spring were uncertain. It was a question, for a time, whether the few colonies which survived the prolonged, intense cold could be successfully brought through to productiveness. Fortunately, the prevailing spring conditions favored the building up of the colonies, so that many a colony, which early in the season was of doubtful value, rapidly improved and produced a surplus. The number of colonies throughout the State, however, was cut in half, the exact percentage of winter loss being 57 per cent, as is explained in some detail elsewhere. Some of this tremendous mortality has been made up, but it can scarcely be said that there were as many colonies of bees in Massachusetts last fall (1918) as there were the previous fall. In some instances the losses which beekeepers experienced discouraged them from keeping more bees. However, the current scarcity of sugar has awakened new interest in many beekeepers, and has suggested beekeeping to persons who heretofore had not attempted the industry. The severe winter loss also had its direct effect upon the disease situation. Not only did it reduce the number of possible cases of disease, but, in many instances, killed colonies which were weakened from disease or which had otherwise been neglected. In a certain measure, therefore, the winter mortality has improved beekeeping conditions, but only to the extent of eliminating neglected, uncared-for, and hence unproductive, colonies.

Co-operation of the United States Department of Agriculture.

The emergency co-operation with the United States Department of Agriculture, which was undertaken May 1, 1917, has been continued. As collaborator of the Bureau of Entomology

of the Federal department, the writer has sent out numerous circular letters and announcements to the beekeepers. The Department of Agriculture has also sent out, for the writer, to each beekeeper of the State, bulletins which have been issued during the current year. A series of three Farmers' Bulletins, pertaining to sweet clover, were also sent out by the Department. The writer resigned his collaboratorship, October 1, 1918.

Appointment of Beekeeping Agents.

The policy, inaugurated in 1917, of appointing beekeeping leaders, or, as they are known, "agents" in beekeeping of the Board of Agriculture, in such towns, where possible, has been continued. There are now serving 79 prominent beekeepers. The service which these beekeepers have rendered, not only to their constituents but also to the office of the Inspector of Apiaries, is inestimable. These agents serve as a bond between the beekeepers of a given town, or group of towns, and the inspector's office. In some instances the office has been kept informed of local conditions, and, through the courtesy of the agent, oftentimes has been able to reach certain beekeepers who otherwise have not been readily accessible. The appointment of agents, therefore, is particularly to be recommended.

Typical of the services rendered by the agents is the following quotation in response to a request for preliminary information concerning the winter loss. The agent for Taunton replied, under date of April 10: —

> I am in a position to take account of each beekeeper's bees in the city of Taunton and surrounding towns. I have found in Taunton 37 beekeepers with 141 swarms among them this winter. This spring during March and first of April there were 58 swarms alive and 83 dead.

Incidentally, it is of interest to observe how closely the winter loss, estimated for Taunton, approaches the percentage of winter loss for the State, as figured out below.

The Listing of Extractors.

The office of the Inspector of Apiaries has maintained a list of beekeepers who have offered the services of their extractors to near-by beekeepers, similar to the arrangement of the previous year. In a large number of instances, the extractors, listed as available, have been utilized. There are 46 listed and available machines. Some beekeepers have done considerable extracting for their neighbors. The extractor service, therefore, has been of particular emergency value. Moreover, it would seem to have increased the interest in extracted honey production and to have stimulated the beekeeper, in some instances, to own his extractor. Beekeepers are again urged to consider more seriously the advantages of extracted honey production, and the advisability of producing, in 1919, even more extracted honey than heretofore. It is again safe to predict that there will be no overproduction.

The Formation of The Federated Massachusetts Beekeepers' Association, Inc.

On March 23 there was held, as announced to the beekeepers of the State, a meeting at Horticultural Hall, Worcester, for the purpose of considering the perfection of the organization of a beekeepers' association, which should be State-wide in its scope, and which should bond, or federate, the several local beekeepers' associations. On this day there was duly organized, and subsequently incorporated, "The Federated Massachusetts Beekeepers' Association." The following officers were elected: —

President, Mr. O. M. Smith of Florence.
Vice-president, Mr. O. F. Fuller of Blackstone.
Secretary-treasurer, Miss Dorothy Quincy Wright of Chelmsford.
The Commissioner of Agriculture and the State Inspector of Apiaries were voted to be *ex-officio* members.

Beekeeping Exhibition at Worcester.

The Inspector of Apiaries held at the winter meeting of the Board of Agriculture, January 9, 1918, not only a series of lectures and demonstrations, but an exhibition of honey and

beekeeping material. The honey displayed was a collection representative of Massachusetts production. Samples bottled in uniform bottles were procured from various beekeepers throughout the State. There was also a small collection of out-of-State honey.

For this meeting, as the principal speaker, Mr. E. R. Root of Medina, Ohio, was obtained, who delivered an address on "The Importance of Honey Production." [1]

Brood Diseases of Bees.

Visits have been made to 1,613 apiaries. Some of the apiaries were revisited several times. In some instances, too, visits have been made by "agents." The number of quarantines issued for either American or European foul brood is 63 (there were but 14 apiaries in which American foul brood was found).

Due to the delinquency, or, in some instances, the inability of the beekeeper to master the control of his cases of disease, and, in a few instances, because disease was discovered late in the season — too late to be successfully treated — it has been necessary to hold over in quarantine a limited number of apiaries. Holdovers, it will be noticed, occur from several years back in a few instances. This is explainable from the fact that it has been impossible to revisit some of these apiaries, and from the fact, in some instances, too, that the disease has not been successfully suppressed. In all, there are 61 apiaries still held in quarantine. The tabulation occurs below: —

Table of Current Quarantines.

Date.	European Foul Brood.	American Foul Brood.	Totals.
1912,	1	-	1
1915,	18[2]	-	18
1916,	8	5	13
1917,	3	1	4
1918,	18	7	25
Totals,	48	13	61

[1] Published as Circular No. 81 of the Board of Agriculture.

[2] American foul brood in 1 apiary, also.

It has been possible to release, during the current year, 121 apiaries, 15 of which were quarantined for American foul brood, 100 for European foul brood and 6 either for American or European foul brood.

American Foul Brood.

As has been previously enumerated, American foul brood is very largely suppressed. For several years past, the writer has emphasized the gradual retreat of this disease into the background. It is unfortunate that American foul brood colonies were shipped through error to Massachusetts from another State during the past year. These colonies were quickly located, however, and have either been destroyed or subjected to treatment.

American foul brood was found in Berkshire County for the first time on record. This case was one from an outside source. It was quickly recognized, and the diseased colony destroyed. It is impossible that any spread of infection could have occurred. Out of the 162 colonies found diseased during the year, 25 were diseased with American foul brood.

European Foul Brood.

The number of possibilities for infected colonies, during the past year, has been greatly reduced by the severe winter mortality. Weak colonies were killed off during the winter in many instances. There were 2,692 colonies examined during the year (in a few instances there were re-examinations). Of the total number of examinations, however, 137 were found diseased with European foul brood.

Beekeepers are becoming more and more aware of the fundamental principles which it is endeavored to teach them for the suppression of this disease. It must be again emphasized that Italianization is, perhaps, the prime factor in the suppression of European foul brood. Italianization almost invariably includes also the following factors: strong colonies, good stores, prolific queens and reasonable care by the beekeeper. At first thought, the last factor might not be considered pertinent, but with Italian bees, it should be remembered that usually the beekeeper is more inclined to care for his colonies than were the colonies hybrids or other vicious strains.

It should not be considered that all Italian races are equally resistant to European foul brood. There is a preference. It is the beekeeper's duty to select resistant strains and to propagate them. Resistance to disease should not be the only factor, but the beekeeper should also seek productiveness.

With the treatment of European foul brood by the dequeening and requeening process, which in most instances is now advised, the productiveness of the colony is less interfered with. By this method, European foul brood may be suppressed, and the crop of extracted honey produced at the same time. It can hardly be expected that colonies under treatment are in condition for comb honey production, however.

It has been found necessary for the inspectors to treat and destroy very few colonies. The smallest number in years,—11 colonies,—was destroyed. The inspectors, however, have treated, or assisted in treating, a considerable number of colonies as demonstrations.

Loss of Bees through Spray Poison.

Very little information or complaint has reached the writer during the past season of the loss of bees through spray poisons. In previous years considerable loss has been alleged. It is hoped that the user of poisonous spray mixtures has learned to spray his trees when they are not in bloom, and to be cautious about letting spray mixtures drift and fall upon clover or other blossoms of small plants and bushes, which may be adjacent to the trees being sprayed, and which may be visited by bees for nectar. Inspectors are ever alert to assist the beekeeper and his neighboring orchardists in securing a proper understanding of the time and way to spray.

Winter Losses.

One of the most severe, intense and protracted winters which history records was experienced in 1917–18. Not only was the cold intense, but it was continued. Were it within the province of this report to review the meteorological records, some interesting data in relationship to the winter mortality would be expressed. The winter losses in 914 apiaries amounted to 57 per cent of the number of colonies the

previous fall. In the fall of 1917, in this number of apiaries, there were 4,818 colonies. In the spring of 1918, there remained 2,768, a total loss of 2,050 colonies. The high rate of winter loss was not local, but occurred throughout eastern United States to a large degree.

Mr. George P. Wood of Peekskill, New York, reported under date of April 3, 1918, an interesting comparison of the losses which occurred there.

> I have lost 20 colonies out of 96, and it would require a detective to determine the cause unless it was principally unsatisfactory honey: 48 were thoroughly packed in quadruple cases and 12 died; 48 were wrapped and 8 died; 68 were in square hives and 14 died; 20 were in "warm-enough" hives and 4 died; 8 were in 8-frame Langstroth hives and 2 died; 44 square hives were in the cases and 11 died; 4 "warm enough" hives were in a case and 1 died. I considered the colonies in the Langstroth hives to be among the strongest, as they were not disturbed much last year. There was no starvation, with honey 4 inches away or less. There was some dysentery, and I think the honey was not suited to bees so long confined. I doubt if the cases were much help either this year or last.

In eastern Massachusetts one beekeeper lost 100 colonies out of 193. Total losses by some of the small and less-experienced beekeepers were not infrequent. The beekeepers have not yet completely recovered their losses. On the basis of the figures which are available among 914 apiarists whose winter losses it was possible to compute, but a small increase over the spring count has been made. These beekeepers had 2,768 colonies in the spring, and, according to the records, had increased to 2,896 (this last figure is merely relative, but represents the minimum increase, because some of the information was collected during the summer and does not accurately represent the fall count in these apiaries). This shows the relative difficulty with which recovery from the losses of the previous season is made.

Some would say that this high winter mortality could have been avoided. Analysis of the cause for the mortality is impossible. A few of the contributing factors, however, may be enumerated. Not only was the severe winter a factor, but perhaps even more significant was the lack of preparation by beekeepers and scarcity of good stores. The beekeepers were not to blame in all instances for the shortness or poorness of stores.

Sugar, in the fall of 1917, was scarce, and, in many instances, the beekeeper had no choice other than to allow the bees to attempt to winter on the poor stores which they had gathered in the fall. In January it was possible to afford the beekeeper soft candy, which materially assisted in counteracting the lack of stores and the poorness of them. The soft candy was supplied through four distributing centers.

The factor which caused considerable loss was the poor preparation and protection of the colonies. In the fall of 1917, the beekeepers were warned to protect their bees. Printed information was sent out to each beekeeper in the State. Most of the beekeepers also had the recommendations of the United States Department of Agriculture for packing bees which are to be wintered out-of-doors. The inspectors and others have noticed that those beekeepers who carefully prepared their bees for the winter according to approved methods usually succeeded in wintering them better than those who gave their bees no preparation or protection. The results of the winter of 1917–18 should impress upon each beekeeper that outward protection of bees wintered on summer stands is necessary.

The conditions prevailing in the fall of 1918 suggests that there may be a winter mortality resulting from short stores. This year the stores are generally good, but rain during September prevented many colonies from completely satisfying their needs. Of the necessary sugar for feeding bees 100 per cent has been available through the Food Administrator. Measures are being taken to provide beekeepers soft candy for additional stores. It is hoped that the beekeepers will carefully determine deficiencies in the provisions of their colonies and supply these in time to save their stock.

Miscellaneous Work.

Correspondence.

During the year there has been an increased request for bulletins. In the spring there was a widespread suggestion, stimulated probably by the scarcity of sugar, that any one might profitably keep a colony of bees and thereby supplement their sugar supply. Such propaganda is unwarranted, and, as a result, increased the correspondence. Beekeeping being an ex-

treme speciality, prospective beekeepers were warned against undertaking something which possibly might lead them into difficulties. At the same time, they were urged to undertake beekeeping if they could give it serious and conscientious attention. As a whole, the correspondence of the year has been normally heavy.

Publications.

Besides the circular letter and postal card announcements issued co-operatively with the United States Department of Agriculture and the Federal bulletins distributed, there have been distributed two new publications of the Apiary Inspection Series.

Bulletin No. 13 is the Eighth Annual Report of the Inspector of Apiaries for the year 1917. Bulletin No. 14 is entitled "Everyday Essentials of Beekeeping."

Mr. E. R. Root's paper, "The Importance of Honey Production," has been distributed as Circular No. 81 of this Board.

Meetings.

The writer has attended ten local meetings during the year besides lecturing in Providence, Rhode Island, on March 2 for the Rhode Island Board of Agriculture.

Under the auspices of the Worcester County Beekeepers' Association, there was held in Acton on April 22 an extension meeting of beekeepers. The directors of the Worcester County Beekeepers' Association are empowered and propose to hold, from time to time, similar extension lectures about the county. This policy of a beekeepers' association is commended.

Appointments and Resignations.

The following deputy inspectors were reappointed to serve during the current season: Mr. O. F. Fuller of Blackstone; Mr. Ivan Rawson of Richmond; and Mr. Edwards Thorne of Worcester. Mr. Rawson entered military service in September.

The writer regrets that in order to accept the position of Provincial Apiarist of Ontario, Canada, it has been necessary to resign his duties in Massachusetts with the close of the present fiscal year. The work during the past nine years has been pleasant; the continued co-operation of Massachusetts' thou-

sands of beekeepers is appreciated. The writer will enjoy hearing from the beekeepers of Massachusetts and assures them that their problems are still his. As a citizen of Massachusetts, he urges the maintenance of high beekeeping standards, and wishes the beekeepers continuance of success.

FINANCIAL STATEMENT, NOVEMBER 30, 1918.

Appropriation,	$2,000 00
Compensation of inspectors,	1,055 00
Traveling and expenses,	650 89
Supplies (postage, printing, etc.),	24 55
Clerical services,	97 85
Balance,	171 71

Respectfully submitted,

BURTON N. GATES,
State Inspector of Apiaries.

AMHERST, MASSACHUSETTS,
December 1, 1918.

ANNUAL REPORT

OF THE

GENERAL DAIRY AGENT.

DECEMBER 19, 1918.

ANNUAL REPORT OF THE GENERAL DAIRY AGENT.

To the State Department of Agriculture.

I have the honor to report herewith the work of the former Dairy Bureau of the State Board of Agriculture, which, since September 1, has been continued by the present Department of Agriculture.

ENFORCEMENT OF DAIRY LAWS.

The enforcement of dairy laws, so far as this Department is concerned, is mainly for the purpose of correcting and preventing commercial fraud, and therefore differs both in purpose and method from the enforcement of so-called health laws. The work itself has to be performed by a different force of men and in a different manner. Buying has to be done by a person whose identity is unrecognized by the seller in the one case, while samples for analysis are taken by a known agent in the other. This statement is made by way of explanation, for it is sometimes wrongly charged that the work of the Dairy Bureau duplicates that of another State department; theoretically there might be overlapping, but practically there is very little.

In our judgment prosecutions for commercial fraud in all foodstuffs should be made by the State Department of Agriculture, and those relating to public health by the State Department of Health.

In the year just closed 86 cases have been entered in court, which resulted in 85 convictions. These are summarized as follows: —

Selling renovated butter in unmarked packages,	30
Selling oleomargarine in restaurants, etc., without notice to guests,	48
Selling oleomargarine in unmarked package,	1
Selling oleomargarine without proper sign on wagon,	2
Selling adulterated milk,	5

These violations and prosecutions, together with law violated, took place as follows: —

Location of Violation.	Where tried.	Month.	Number.	Law violated.	Convictions.	Discharged.
Haverhill,	Haverhill,	December,	8	6 renovated butter, 2 oleomargarine,	8	–
Lawrence,	Lawrence,	December,	14	14 oleomargarine,	14	–
Peabody,	Peabody,	December,	2	2 renovated butter,	2	–
Lowell,	Lowell,	January,	12	2 renovated butter, 10 oleomargarine,	12	–
Charlestown,	Charlestown,	February,	2	2 renovated butter,	2	–
Lynn,	Lynn,	February,	10	6 renovated butter, 4 oleomargarine,	10	–
Southbridge,	Southbridge,	February,	10	10 renovated butter,	10	–
Cambridge,	Cambridge,	March,	2	2 oleomargarine,	1	1
Gardner,	Gardner,	March,	1	1 milk,	1	–
Hardwick,	East Brookfield,	March,	1	1 milk,	1	–
New Bedford,	New Bedford,	March,	11	9 oleomargarine, 2 renovated butter,	11	–
New Bedford,	New Bedford,	April,	2	2 oleomargarine,	2	–
Worcester,	Worcester,	April,	8	8 oleomargarine,	8	–
Gardner,	Gardner,	June,	1	1 milk,	1	–
Gardner,	Gardner,	July,	1	1 milk,	1	–
Burlington,	Woburn,	August,	1	1 milk,	1	–
Totals,			86		85	1

Total number of inspections for the year was	4,203[1]
Number of inspections where no samples were purchased or taken,	3,485
Number of samples of butter, oleomargarine and renovated butter, all purchased,	712
Number of samples of milk,	24

ENCOURAGEMENT OF DAIRYING.

An industry as important to the consumer, and as uncertain and often unprofitable to the producer, as dairying needs more encouragement than perhaps any other agricultural industry. If consumers would only use all the milk that is best for their well-being, supply and demand would ultimately take care of the situation. Until such time much has to be done. The efforts of this Department for years have been to increase milk consumption through the spread of food value of milk propaganda, and to improve the quality through clean milking contests. The clean milking contests have educated and encouraged hundreds of milkers to adopt better methods, and now the prizes offered for better grade heifers of the milk-producing breeds is another step taken, not only to encourage the dairy farmer to better efforts, but to furnish in the end better and cheaper milk to the consumer.

ENCOURAGEMENT OF DAIRYING PRIZE CONTESTS, 1918.

The Clean Milking Contest.

The following notice was sent to women, girls and boys on dairy farms: —

You can help win the war. Learn to milk cows and assist in the outdoor work on the dairy farm. At the same time earn part of the $734.50 offered in prizes by the Commonwealth of Massachusetts through the Dairy Bureau of the State Board of Agriculture.

[1] There were 18 extra samples taken during the year, therefore this total is 18 less than the sum of the next three items.

Prizes for Clean Milking.

First,	$25 00	Twenty-fifth,	$13 00
Second,	24 50	Twenty-sixth,	12 50
Third,	24 00	Twenty-seventh,	12 00
Fourth,	23 50	Twenty-eighth,	11 50
Fifth,	23 00	Twenty-ninth,	11 00
Sixth,	22 50	Thirtieth,	10 50
Seventh,	22 00	Thirty-first,	10 00
Eighth,	21 50	Thirty-second,	9 50
Ninth,	21 00	Thirty-third,	9 00
Tenth,	20 50	Thirty-fourth,	8 50
Eleventh,	20 00	Thirty-fifth,	8 00
Twelfth,	19 50	Thirty-sixth,	7 50
Thirteenth,	19 00	Thirty-seventh,	7 00
Fourteenth,	18 50	Thirty-eighth,	6 50
Fifteenth,	18 00	Thirty-ninth,	6 00
Sixteenth,	17 50	Fortieth,	5 50
Seventeenth,	17 00	Forty-first,	5 00
Eighteenth,	16 50	Forty-second,	4 50
Nineteenth,	16 00	Forty-third,	4 00
Twentieth,	15 50	Forty-fourth,	3 50
Twenty-first,	15 00	Forty-fifth,	3 00
Twenty-second,	14 50	Forty-sixth,	2 50
Twenty-third,	14 00	Forty-seventh,	2 00
Twenty-fourth,	13 50		

Fifty additional prizes of $2 each are offered. A certificate of award will accompany each prize, and a special certificate will be given to the person obtaining best results.

Rules for Clean Milking Contest.

1. These prizes are open for contest to women, girls and boys who live or work upon farms which keep three or more cows, and the owners of which are practical farmers superintending their own dairies and gaining their principal livelihood from the farm. All contestants must be of either the regular or emergency milking force on the farm. Decisions of the Dairy Bureau as to eligibility shall be final.

2. All entries must be made on or before June 30, 1918.

3. Dairies shall be visited at times most convenient to the agents, but all samples will be taken, as far as possible, during the months of July and August. No advance notice will be given of the day the sample is to be taken. Owners of dairies will be communicated with by telephone, or otherwise, on the day the samples are to be taken. Milking must not be begun until after the agent arrives. No impractical method and no receptacles other than those in everyday use by the contestant in milking will be allowed. In case of change of help the new employee, if of proper age, may be substituted by the owner.

4. A sample of hand-drawn, unstrained, mixed milk from three cows will be taken and tested for sediment.

5. The dairies must be open for full and complete inspection, and questions asked by the agents must be fully answered.

6. Each sample shall be numbered by the agent, and that number, known only to him, shall be written on the inside of the box holding the sediment sample, and the box sealed at once. The same number shall be written upon a card bearing the names of the owner of the dairy and the contestant, and shall be sealed in an envelope. These cards and samples shall be delivered to the General Agent of the Dairy Bureau of the State Board of Agriculture. The envelope containing the names of the owner and the contestant shall not be opened until after the awards have been made.

7. The prizes will be awarded by competent experts, and the decision of the judges shall be final.

8. No prize shall be allowed except in cases where milk is meritoriously clean.

9. The right to reject or cancel any or all entries is reserved by the Dairy Bureau.

SUGGESTIONS.

Begin the practice of milking into a pail, can or hod with small opening now, and thus insure the use of such receptacle in the contest.

Remove all dirt from each cow's udder and flanks, and wipe with a damp cloth.

Milk with clean clothes and clean, dry hands.

Hold the receptacle in such manner that no dirt can fall upon the milk.

Carefully remove with a clean cloth or paper any foreign matter accidentally collecting upon or within the receptacle used in milking before pouring, thus preventing such matter either from falling or being washed into the mixing can. Pour from the cleanest side of the opening. Rinse receptacle with clean water before milking the next cow.

The hearty co-operation of owners of farms, the milkers on which are eligible in this contest, is most earnestly solicited.

A REPUTATION FOR CLEAN MILKING MEANS DOLLARS.

GET THE HABIT.

In response to the above, 207 entries were made and 185 persons actually competed.

List of Prize Winners.

Prize.	Winner.	Farm.
First,	Mrs. Annie Wickman,	Otto Wickman, Gardner.
Second,	Sophia Hendrickson,	Emil Hendrickson, Templeton.
Third,	Maxine Rhoades,	Clayton N. Rhoades, Williamsburg.
Fourth,	Albert W. Dowd,	S. H. Dowd, Raynham Center.
Fifth,	Mrs. A. Erickson,	Andrew Erickson, Westminster.
Sixth,	Wikoryja Kasprzak,	Joseph Kasprzak, Monson.
Seventh,	James H. Dean,	Lorenzo Dean, Boylston.
Eighth,	Mrs. Maria Anderson,	Lars Anderson, Holden.
Ninth,	Oliva Dragon,	A. Dragon, Ware.
Tenth,	John Moriarty,	Mrs. Josephine Moriarty, Ware.
Eleventh,	Alice Matson,	Louis Matson, Millbury.
Twelfth,	Lincoln Batcheller,	Fred L. Batcheller, Sutton.
Thirteenth,	Willis J. Perry,	George N. Perry, Millbury.
Fourteenth,	Albert Brown,	A. E. Brown, Lunenburg.
Fifteenth,	Louise Weeks,	Kusti Weeks, Westminster.
Sixteenth,	Clarence M. Parsons,	H. A. Parsons, North Amherst.
Seventeenth,	Ida Asp,	Victor Asp, Westminster.
Eighteenth,	Anna Carlstrom,	Charles Carlstrom, Auburn.
Nineteenth,	Ottavine Matson,	Louis Matson, Millbury.
Twentieth,	Mary Szcepanek,	Stanley Szcepanek, Ware.
Twenty-first,	Kate Allhusen,	H. H. Allhusen, Monson.
Twenty-second,	Winthrop Gleason,	Chauncy Gleason, Haverhill.
Twenty-third,	Jeffrey Roy,	Wm. E. Hartnett, Fitchburg.
Twenty-fourth,	James Wentworth,	Dwight G. Taylor, Granby.
Twenty-fifth,	Mary J. Rosa,	Joseph Rosa, Raynham.
Twenty-sixth,	Hurman Hultgren,	Carl G. Hultgren, Holden.
Twenty-seventh,	Mrs. D. F. Danckert,	D. F. Danckert, Northborough.
Twenty-eighth,	Mrs. Katherine Hayden,	John N. Bean, Westminster.
Twenty-ninth,	Nellie Quirk,	John Quirk, Ware.
Thirtieth,	Edward J. Vaine,	Joseph Vaine, Winchendon.
Thirty-first,	Harold F. Johnson,	Fred A. Johnson, Ware.
Thirty-second,	Michael Doyle,	Daniel C. Lunt, Newburyport.
Thirty-third,	Henry L. Cutting,	George A. Cutting, Fitchburg.
Thirty-fourth,	Sarah Daniels,	Frank E. Daniels, North Adams.
Thirty-fifth,	Arthur Stark,	Fred C. Stark, Boylston.
Thirty-sixth,	Mrs. W. H. Atkins,	W. H. Atkins, South Amherst.
Thirty-seventh,	Arthur Frenier,	Wm. Frenier, North Adams.

List of Prize Winners — Concluded.

Prize.	Winner.	Farm.
Thirty-eighth,	Robert W. Sharkey, Jr.,	Harry L. Carpenter, Attleboro.
Thirty-ninth,	Percy Brown,	A. E. Brown, Lunenburg.
Fortieth,	Webster Ottman,	C. M. Ottman, North Adams.
Forty-first,	William Webb,	Kenneth E. Webb, Needham Heights.
Forty-second,	Katri Bjorbacka,	Charles Bjorbacka, Templeton.
Forty-third,	Justin Palmer,	Everett B. Fox, Lowell.
Forty-fourth,	Valbert Dragon,	A. Dragon, Ware.
Forty-fifth,	Walter B. Shaw,	S. M. Shaw, Millbury.
Forty-sixth,	Amelia Jackowski,	Stanislaus J. Jackowski, Agawam.
Forty-seventh,	Prentiss N. Jenks,	Lee S. Jenks, Feeding Hills.

Winners of Additional Prizes.

Winner.	Farm.
Carrie L. Andrews,	Frank E. Andrews, Ware.
Samuel Babbitt,	Marchant Martin, Framingham.
Cora B. Ballou,	A. H. Ballou, Ware.
Max Benz,	W. E. Demond, North Adams.
Karalern Bergstrom,	John Bergstrom, West Millbury.
Paul Bradford,	Melvin O. Bradford, Acushnet.
Dorman Clairmont,	Moses Clairmont, North Adams.
Alexander R. Curtis,	Thomas A. Niland, Phillipston.
William P. Cutting,	George A. Cutting, Fitchburg.
Emile Davis,	George W. Putnam, Easthampton.
Armand Dragon,	A. Dragon, Ware.
Franklin V. Epps,	C. Bertram Epps, Winchendon.
Adolph Erickson,	Andrew Erickson, Westminster.
James V. Fairbanks,	Robert F. Fairbanks, Fitchburg.
Arthur D. Files,	G. R. Files, Ludlow.
J. Warren Files,	G. R. Files, Ludlow.
William Frenier,	William Frenier, North Adams.
Mrs. Katie Haas,	Jacob Haas, West Springfield.
Carolina Hagstrom,	Peter Hagstrom, Gloucester.
Margaret Hartnett,	William E. Hartnett, Fitchburg.
Forbes L. Henshaw,	D. F. Henshaw, West Brookfield.
Clara Hertel,	Robert Hertel, Fitchburg.

Winners of Additional Prizes — Concluded.

Winner.	Farm.
Rosa M. Hertel,	Robert Hertel, Fitchburg.
Guilford Hultgren,	Carl G. Hultgren, Holden.
Hugo Hultgren,	Carl G. Hultgren, Holden.
George A. Jackson,	Robert Jackson, Hardwick.
William T. Jackson,	Robert Jackson, Hardwick.
Alpheus Jones,	W. O. Eames, Chester.
Howard Jordan,	Charles B. Jordan, Holden.
Joseph T. Kivlin,	Miss Anna H. Whitney, Lancaster.
Mrs. Anna Larson,	John Larson, Templeton.
Arvid Larson,	A. Larson, Hampden.
James McGrath,	Patrick H. McGrath, West Millbury.
Stephen Mangan,	P. H. Mangan, Avon.
Leo Morton,	George H. Timmins, Ware.
Ida Paikonen,	Hati Paikonen, Gardner.
Ruth Persson,	Per Persson, East Longmeadow.
Almida Persson,	Per Persson, East Longmeadow.
Walter W. Pickwell,	John Pickwell, North Adams.
Daniel F. Pond,	Louis N. Mahlhoit, Sutton.
R. A. Price,	E. H. Price, Lunenburg.
Albert E. Rockwood,	A. W. Rockwood, Lunenburg.
Albert Spyut,	Albin Spyut, Ipswich.
Robert J. Stevens,	John C. Rolfe, Newburyport.
Lydia Talvitie,	John Talvitie, Gloucester.
C. A. Tiffany,	W. H. Atkins, South Amherst.
Herbert W. Townsend,	George W. Townsend, Shelburne Falls.
Ida F. Winnikainen,	Victor Winnikainen, Gardner.
John Wirf,	Joseph W. Clark, West Brookfield.
Charlie Wuth,	Emil Wuth, Fitchburg.

In view of the excellent results obtained, certificates of honorable mention were given the following contestants: —

Honorable Mention List.

Winner.	Farm.
Prescott Adams,	Charles R. Adams, Medway.
Cecil E. Alderman,	Edwin H. Alderman, Chester.
Francis R. Andrews,	Frank E. Andrews, Ware.
Melvin F. Andrews,	W. J. Campbell, Ware.
Dominic Anzivino,	Leonard Anzivino, Chestnut Hill.
Harold K. Avery,	Myron B. Avery, Montgomery.
Raymond B. Avery,	Myron B. Avery, Montgomery.
Phyllis Batcheller,	Fred L. Batcheller, Sutton.
Tore Bengston,	Per Persson, East Longmeadow.
Ellen Bernard,	Paul Bernard, North Adams.
Floyd D. Blanchard,	D. W. Blanchard, North Adams.
Mariel E. Boutelle,	E. H. Boutelle, Leominster.
J. Walter Callahan,	John F. Callahan, Lowell.
John Cardinal, Jr.,	John Cardinal, Clarksburg.
Leon F. Dakin,	Arthur A. Dakin, North Sudbury.
Milton H. Dakin,	Arthur A. Dakin, North Sudbury.
Richard Daniels,	Frank R. Daniels, North Adams.
William A. Daniels,	Frank R. Daniels, North Adams.
Andrew Doubleday,	Frank A. Doubleday, North Dana.
Charles S. Douglas,	Charles R. Adams, Medway.
Francis Doyle,	Daniel C. Lunt, Newbury.
Albert E. Elwell,	Albert Elwell, Byfield.
Arthur Elwell,	Albert Elwell, Byfield.
G. William Files,	G. R. Files, Wilbraham.
Lawrence Frenier,	William Frenier, North Adams.
Mrs. Hilda Hall,	Simon Hall, North Wilbraham.
William Hall,	J. T. Simpson, Westford.
Joseph P. Harris,	Clifford R. Harris, West Millbury.
Werner Hermanson,	Eric Hermanson, Templeton.
Horace House,	Arthur House, Chelmsford.
Francis E. Jackowski,	Stanislaus J. Jackowski, Agawam.
Leonard W. Knight,	E. W. Knight, Newburyport.
Richard H. Knight,	E. W. Knight, Newburyport.
Mrs. Charlotte E. Kratsch,	Charles E. Kratsch, Attleboro.
Harold Landers,	P. J. Landers, Belchertown.
Maynard Wallace Lane,	H. Wallace Lane, Gloucester.

Honorable Mention List — Concluded.

Winner.	Farm.
Walter Larson,	A. Larson, Hampden.
Francis McGrath,	Patrick H. McGrath, West Millbury.
Dianna Mailloux,	Alex Mailloux, Dracut.
Ida Majanen,	Alfred Majanen, Westminster.
Anna Mattilla,	Gustaf A. Mattilla, Westminster.
John Maxon,	Arthur D. Pease, Middlefield.
Michael Miller,	Anthony Miller, Templeton.
Nellie Miller,	Anthony Miller, Templeton.
Vernon D. Mudgett,	Mrs. Fred L. Mudgett, Lancaster.
Lucy A. Nason,	Edward M. Nason, Haverhill.
Zachary Navaroli,	John Navaroli, West Boylston.
Anna S. Nelson,	Carl E. Nelson, Gardner.
Preston C. Newhall,	Asa T. Newhall, Newburyport.
Edward F. Parsons,	H. A. Parsons, North Amherst.
Clifford J. Patric,	George H. Patric, Hampden.
Lester Ribero,	G. F. Ribero, Franklin.
Mrs. Ethel Ricard,	Joseph Ricard, Hampden.
Clifford Rideout,	D. R. Rideout, Raynham.
Alice A. Romanoski,	Joseph Romanoski, Hardwick.
Albert Romanoski,	Joseph Romanoski, Hardwick.
Joseph Romanoski, Jr.,	Joseph Romanoski, Hardwick.
William Romanoski,	Joseph Romanoski, Hardwick.
Edith M. Rosa,	Joseph Rosa, Raynham.
Thomas Rose,	Manuel F. Rose, North Dighton.
Walter B. Shaw,	S. M. Shaw, Sutton.
Aina Soini,	Frank Soini, Fitchburg.
John C. Stark,	Fred C. Stark, Boylston.
John Talvitie, Jr.,	John Talvitie, Gloucester.
Sarah Wood,	Alfred Wood, Clarksburg.
H. G. Woodward,	J. A. Woodward, Lunenburg.
Douglas Workman,	Everett B. Fox, Lowell.

Prizes offered to Local Milk Inspectors.

To local inspectors of milk in cities and towns supplied by more than fifty dairies, and having fifteen or more separate entries in the 1918 Clean Milking Contest for the greatest number of superior merit cottons, the following prizes were offered: —

First prize,	$25 00
Second prize,	20 00
Third prize,	15 00
Fourth prize,	10 00
Fifth prize,	5 00

The following awards were made: —

First prize, Stephen C. Downs, Springfield.
Second prize, Gustaf L. Berg, Worcester.
Third prize, Harry O. Knight, Gardner.
Fourth prize, John F. Bresnahan, Fitchburg.
Fifth prize, D. W. Hyde, North Adams.

To local inspectors of milk in cities and towns supplied by less than fifty dairies, and having five or more separate entries in the 1918 Clean Milking Contest for the greatest number of superior merit cottons, the following prizes were offered: —

First prize,	$16 00
Second prize,	12 00
Third prize,	10 00
Fourth prize,	8 00
Fifth prize,	5 00

The following award was made: —

First prize, Fred E. Marsh, Ware.

A special certificate was awarded Harry O. Knight, Gardner, in consideration of the excellent results achieved by his contestants.

Dairy Products Show.

A milk, cream, butter and cottage cheese exhibit was held under the auspices of the Allied Dairy Interests of Massachusetts in connection with the Public Winter Meeting of the State Board of Agriculture at Worcester, January 8 to 10, 1918. The

show was financed by the State Board of Agriculture, and was superintended by O. A. Jamison, acting secretary of the Massachusetts Dairymen's Association.

The prize winners in the several classes were as follows: —

CLASS 1. — *Market Milk (Raw), Massachusetts Produced.*

[Six entries.]

NAME.	Address.	Prize.	Score.
J. S. Ames,	North Easton,	First, $10,	96.50[1]
N. E. Borden,	South Sudbury,	Second, $5,	96.50[1]
A. C. Huggins,	Andover,	Third, $4,	93.50
E. M. Vieweg,	Fitchburg,	Fourth, $3,	91.20
E. H. Flagg,	Littleton,	Fifth, $2,	89.40
J. L. Collins,	Woburn,	Sixth, $1,	85.00

[1] Tie broken by bacteria count.

CLASS 2. — *Market Milk (Pasteurized), Massachusetts Produced.*

[One entry.]

Robert Mitchell,	New Bedford,	First, $10,	86.30

CLASS 3. — *Market Milk (Raw) for Sale in Massachusetts.*

[Two entries.]

N. E. Borden,	South Sudbury,	First,	97.00
A. C. Huggins,	Andover,	Second,	85.20

CLASS 5. — *Market Milk, City and Town Health Boards.*

[Eleven entries.]

George E. Bolling, inspector of milk.	Brockton,	First, silver cup,	97.33
Maurice Dineen, inspector of milk.	Winchester,	Second, silver cup,	95.15
Dr. George W. Stanbridge, inspector of milk.	Winchendon,	Third, silver cup,	94.52
D. W. Hyde, agent, Board of Health.	North Adams,	Fourth, silver cup,	94.50
John F. Bresnahan, inspector of milk.	Fitchburg,	Fifth, silver cup,	93.85

Special Prize. — The State Board of Agriculture cup, offered to the Board of Health of the city or town winning first position in Class 5, was won by Brockton for the third time, and now becomes the property of that city.

CLASS 6. — *Market Milk (Raw), Massachusetts Produced.*[1]

[Eleven entries.]

NAME.	Address.	Prize.	Score.
W. D. Field,	Shelburne Falls,	First, $10,	98.50
G. O. Soper,	Taunton,	Second, $5,	93.10
J. Nadeau,	Fitchburg,	Third, $4,	92.80
E. Ilsley,	Newburyport,	Fourth, $3,	92.50
A. S. Harris & Son,	Fitchburg,	Fifth, $2,	91.50

E. M. Vieweg, Fitchburg; E. H. Flagg & Sons, Littleton; L. Matson, Auburn; and B. F. Paige, Whitman, received awards of $1 each, having scores ranging from 91.10 to 89.40.

CLASS 7. — *Market Cream (Raw), Massachusetts Produced.*

[Five entries.]

A. S. Harris & Son,	Fitchburg,	First, $10,	97.10
M. O. Bradford,	Acushnet,	Second, $5,	95.30
B. F. Paige,	Whitman,	Third, $4,	93.50

CLASS 8. — *Dairy Butter.*

[Ten entries.]

E. E. Kinsman,	Griswold,	First, $10,	92.50
C. M. Pratt,	Hadley,	Second, $5,	91.50
A. L. Peck,	Bardwell's Ferry,	Third, $4,	90.00
J. S. Foster,	Dudley,	Fourth, $3,	88.00
J. W. Parsons,	Northampton,	Fifth, $2,	85.00

CLASS 9. — *Cottage Cheese.*

[One entry.]

N. E. Borden,	South Sudbury,	First, $10,	—[2]

[1] Limited to dairymen depending on their farms for a livelihood.

[2] No score returned.

The sweepstakes ribbon for the highest scoring milk sample in the show was won by W. D. Field, Shelburne Falls.

In Class 4, Market Milk (Pasteurized) for Sale in Massachusetts, there were no entries.

NOTE. — The Allied Dairy Interests includes the Massachusetts Dairymen's Association, Massachusetts Milk Inspectors' Association, Massachusetts Agricultural College, United States Department of Agriculture, and the Dairy Bureau of the Massachusetts State Department of Agriculture, co-operating.

The Grade Heifer Contest.

The following notice was sent to Massachusetts dairymen: —

The Commonwealth of Massachusetts has placed at the disposal of the State Board of Agriculture a sum not exceeding $5,000 annually for three years, to be expended in the encouragement of practical dairying and the production of milk and dairy products of superior cleanliness, and in developing the live-stock industry of the State.

For five years we have conducted clean milking and other contests. We now propose to do something to encourage the rearing of grade heifers from good milking strains of dairy animals.

For best heifers, sired by pure-bred Ayrshire, Brown Swiss, Guernsey, Holstein-Friesian, Jersey or Shorthorn bulls, and from high-producing grade dams of any breed, to be born between April 1, 1917, and July 31, 1918, inclusive, prizes aggregating $3,000 are offered.

Class.		First Prize.	Second Prize.	Third Prize.	Fourth Prize.	Fifth Prize.	Sixth Prize.	Seventh Prize.	Eighth Prize.
I	Best 6 grade Ayrshire heifers, .	$60	$50	$40	$35	$30	$25	$20	$10
II	Best 6 grade Brown Swiss heifers,	60	50	40	35	30	25	20	10
III	Best 6 grade Guernsey heifers, .	60	50	40	35	30	25	20	10
IV	Best 6 grade Holstein-Friesian heifers.	60	50	40	35	30	25	20	10
V	Best 6 grade Jersey heifers, . .	60	50	40	35	30	25	20	10
VI	Best 6 grade Shorthorn heifers, .	60	50	40	35	30	25	20	10
VII	Best 3 grade Ayrshire heifers, .	35	30	25	20	15	13	10	7
VIII	Best 3 grade Brown Swiss heifers,	35	30	25	20	15	13	10	7
IX	Best 3 grade Guernsey heifers, .	35	30	25	20	15	13	10	7
X	Best 3 grade Holstein-Friesian heifers.	35	30	25	20	15	13	10	7
XI	Best 3 grade Jersey heifers, . .	35	30	25	20	15	13	10	7
XII	Best 3 grade Shorthorn heifers, .	35	30	25	20	15	13	10	7
XIII	Best single grade Ayrshire heifer,	15	14	12	10	9	6	5	4
XIV	Best single grade Brown Swiss heifer.	15	14	12	10	9	6	5	4
XV	Best single grade Guernsey heifer,	15	14	12	10	9	6	5	4
XVI	Best single grade Holstein-Friesian heifer.	15	14	12	10	9	6	5	4
XVII	Best single grade Jersey heifer, .	15	14	12	10	9	6	5	4
XVIII	Best single grade Shorthorn heifer.	15	14	12	10	9	6	5	4

GRATUITIES.

In meritorious instances gratuities may be recommended by the judges and may equal but shall not exceed the amount offered as the eighth prize in each class, and the payment of such gratuities will depend upon money made available as unused prize money.

RULES.

1. These prizes are open for contest only for animals owned by practical dairy farmers who superintend their own dairies and gain their principal livelihood from their farm, and for animals owned by wives, sons or unmarried daughters of such eligible farmers, provided their animals are kept upon said farm and the owners live upon said farm and are mainly dependent on the farm for a livelihood.

2. All heifers eligible for entry must have been sired by pure-bred bulls which are either registered or eligible for registry. Satisfactory proof must be furnished in each instance. In case of registered bulls the certificate of registry will be accepted. In case of pure-bred bulls eligible for registry satisfactory affidavits must be filed at the time of entry.

3. All animals must have been bred and raised by the exhibitor.

4. No animal will be eligible in more than one class.

5. All entries must be made on or before July 31, 1918.

6. All animals must be exhibited at the 1918 annual exhibition of an agricultural society receiving bounty from the State, or such other place as shall be approved by the Dairy Bureau of the State Board of Agriculture, and the exhibit may be made at the society's grounds or approved place most convenient for the exhibitor.

7. Animals will be scored and judged by competent experts, and the decision of these judges shall be final.

8. No prize shall be allowed for unmeritorious animals.

9. The right to reject or cancel any and all entries is reserved by the Dairy Bureau.

10. Results will be announced as soon as possible after the close of the contest.

11. A certificate of award will accompany each cash prize.

Thirty owners made entries in the contest, as follows: —

Grade Ayrshires,	14
Grade Guernseys,	47
Grade Holstein-Friesians,	61
Grade Jersey,	1
Total,	123

Prizes were awarded as follows:—

GRADE AYRSHIRES.

Single Heifers.

First prize, $15, ... Charles J. Lundgren, Orange.
Second prize, $14, . . . Ivory W. Kimball, Rehoboth.

Lots of Six.

First prize, $60, ... Charles J. Lundgren, Orange.
Second prize, $50, . . . Edward W. Gleason, Clarksburg.

GRADE GUERNSEYS.

Single Heifers.

First prize, $15, ... L. O. Clapp, Northfield.
Second prize, $14, . . . Dana Hancock, Chilmark.
Third prize, $12, ... James F. Adams, Chilmark.
Fourth prize, $10, . . . Edwin B. Mellen, Winchendon.
Fifth prize, $9, ... Edwin B. Mellen, Winchendon.
Sixth prize, $6, ... J. Gregory & Son, Winchendon.
Seventh prize, $5, . . . Asa Williams, Winchendon.
Eighth prize, $4, ... Lewis N. Oakes, Clarksburg.
Additional prize, $4, . . . James F. Adams, Chilmark.

Lots of Three.

First prize, $35, ... L. O. Clapp, Northfield.
Second prize, $30, . . . James F. Adams, Chilmark.
Third prize, $25, ... Lewis N. Oakes, Clarksburg.
Fourth prize, $20, . . . Edwin B. Mellen, Winchendon.
Fifth prize, $15, ... Asa Williams, Winchendon.
Sixth prize, $13, ... J. Gregory & Son, Winchendon.
Seventh prize, $10, . . . C. S. Wright, South Sudbury.
Eighth prize, $7, ... Clarence B. Brown, Brimfield.

Lots of Six.

First prize, $60, ... Clarence B. Brown, Brimfield.
Second prize, $50, . . . James F. Adams, Chilmark.

GRADE HOLSTEIN-FRIESIANS.

Single Heifers.

First prize, $15, ... Randall Brothers, Agawam.
Second prize, $14, . . . Jonas Bemis, Charlton.
Third prize, $12, ... D. C. Randall, Belchertown.
Fourth prize, $10, . . . Charles S. Baldwin, Sudbury.
Fifth prize, $9, ... John Erwin, Wayland.

Sixth prize, $6, ... Fred L. Batcheller, Sutton.
Seventh prize, $5, . . . Eloise Bardwell, Shelburne.
Eighth prize, $4, ... Frank B. Haley, Brimfield.
Additional prize, $4, . . . E. H. Alderman, Middlefield.
Additional prize, $3.50, . . Louis N. Mahlhoit, Sutton.
Additional prize, $3, . . . J. E. Belcher, Winchendon.
Additional prize, $2.50, . . Francis Beeman, West Brookfield.
Additional prize, $2, . . George N. Perry, Sutton.

Lots of Three.

First prize, $35, ... Randall Brothers, Agawam.
Second prize, $30, . . . Fred L. Batcheller, Sutton.
Third prize, $25, ... Jonas Bemis, Charlton.
Fourth prize, $20, . . . Cyrus S. Bardwell, Shelburne.
Fifth prize, $15, ... Albert B. Patrick, Warren.
Sixth prize, $13, ... Frank B. Haley, Brimfield.
Seventh prize, $10, . . . John Erwin, Wayland.
Eighth prize, $7, ... D. C. Randall, Belchertown.

Lots of Six.

First prize, $60, ... B. W. Crissey, Great Barrington.
Second prize, $50, . . . Randall Brothers, Agawam.
Third prize, $40, ... Patrick H. McGrath, West Millbury.
Fourth prize, $35, . . . Francis Beeman, West Brookfield.

GRADE JERSEY.

Single Heifer.

First prize, $15, ... W. E. Dyer, Ashfield.

The results of these contests deserve more than passing notice. The clean milking contest aroused much enthusiasm on the part of women and young people on dairy farms. In the grade heifer contest animals were entered which would have proven close competitors with the best of pure breds at the big shows. This was especially true of the Holstein-Friesian grades. The prepotency of certain sires stood out prominently, nor was this altogether confined to registered sires. Some of the pure-bred bulls had transmitted their individuality to a marked degree. If our dairy farmers would but grasp the wonderful importance of keeping or patronizing such sires it would be greatly to their advantage. Next year's contest should enlist more entrants.

ACKNOWLEDGMENTS.

The thanks of the Bureau are extended to Dr. Charles E. Marshall, Professor J. C. McNutt and J. A. Gamble, judges of the clean milking and grade heifer contests, and dairy products show, respectively, for services gratuitously rendered.

DAIRY EXHIBITS.

The results of the 1917 clean milking contest were displayed at the Public Winter Meeting of the State Board of Agriculture at Worcester, January 8, 9 and 10, 1918. An interesting demonstration of making cottage cheese was also given. Extensive preparations were made for exhibits in shows to be held during the autumn months, which were finally canceled on account of the outbreak of influenza. Mr. Lombard, however, took an exhibit to Portland, Maine, where he had charge of the Massachusetts exhibits at the Maine Fruit and Farm Products Show.

LECTURES.

The general agent delivered sixteen lectures on dairying subjects during the year. He also procured the services of Dr. E. V. McCollum of the Johns Hopkins University, who delivered two lectures, one at Worcester and the other in Boston, both of which were well attended, especially by interested workers, which resulted in wide dissemination of Dr. McCollum's discoveries concerning the food value of milk.

INVESTIGATIONS.

The general agent visited both the Johns Hopkins University and the United States Department of Agriculture in his investigations into the food value of milk, and the Bureau made a two days' trip through the milk shipping sections of Maine, visiting the following places: Wiscasset, Richmond, Unity, Troy, Plymouth, East Newport, Cornish, Barton, Ætna, Pittsfield and Auburn; also the Ayredale farm at Bangor and the University of Maine at Orono. The principal object of the trip was for the purpose of studying the methods and shipping stations of the Turner Center Dairying Association. These sta-

tions were found to be models of their kind, and in all instances in most excellent condition, reflecting great credit on their general manager, Mr. E. O. Bradford. The general agent attended the Milk and Dairy Farm Products Show in New York in May, and earlier went to both New York and Detroit to investigate the utility of the Fordson tractor. Concerning the latter trip a separate report was made to the secretary at the time. The Bureau also furnished several important witnesses and considerable literature on the cost of milk production before the Regional Milk Board hearing held early in the year.

PUBLICATIONS.

A new illustrated folder on "Food Value of Milk" has been prepared by the general agent, and 105,000 copies have been printed. New editions and new leaflets relating to milk and its products, labeled B to T, inclusive, have been prepared, and 105,000 copies printed. Two special leaflets, AA and BB, illustrating the importance of milk in connection with other food for children, have also been prepared, and 300,000 copies printed. A combination of these last two, under the title of AA–BB, has been prepared, and 20,000 of each printed in the Italian, Polish and Yiddish languages. Illustrated milk folders numbering 20,000, together with 20,000 advertising milk cards and 5,000 posters, were printed for cottage cheese week distribution, the object being to advertise the value of milk, cottage cheese and other milk products as desirable and economical food.

We especially desire to record our thanks to Miss Dorothy Weil, X-ray photographer at the Boston Children's Hospital, for photographs especially made for us; to the management of the hospital for courtesies extended; to Miss Frances Stern, 20 Ashburton Place, and Alice F. Blood, M.D., Simmons College, for valuable aid and suggestions in the preparation of leaflets AA and BB; to Mrs. Allen Chamberlain for assistance in the foreign language leaflet; to the demonstration workers of the College Extension and Farm Bureau Service; and to all others who aided in distributing our literature on food value of milk, and our circulars promoting the encouragement of dairying.

ADMINISTRATIVE CHANGES.

The members of the Bureau went out of office automatically with the reorganization of the old Board of Agriculture and the creation of the new Department of Agriculture by statute which took effect September 1, 1918. Since that time the work has continued under the direction of the general agent. It was with regret that we parted with the members of the Bureau. The chairman, Mr. Bradway, whose heart was deep in the work, had served the old Board of Agriculture long and faithfully, and Mr. Trull whose geniality and fairness had helped over many rough spots, both retired from the Board, while the younger member, Mr. Taylor, whose education, training and experience as a stock-breeder and dairyman had always been helpful, was appointed a member of the new Department of Agriculture.

EMPLOYEES.

Besides the general agent, the following persons have been employed during the year: —

Analysts, B. F. Davenport, Boston, and Herbert L. Clark, Emerson Laboratory, Springfield.

Agent, A. W. Lombard; also as temporary agents and assistants, Irving K. Wells, Albert B. Loring, Joseph W. Haggerty, George C. Willard and Mabel C. Willard.

SUMMARY.

The work of the Bureau for the year may be summarized as follows: First, enforcement of dairy laws, with special reference to the prosecution of commercial fraud. Second, encouragement of practical dairying (*a*) by lectures and by printing and distributing a large number of circulars, leaflets, etc., relating to the food value of milk and milk products, thus tending to increase the per capita milk consumption, which not only tends to make a stronger and healthier people, but also to create a better market for milk and its products; (*b*) by conducting a clean milking contest for the double purpose of securing clean milk and encouraging women and young people to assist in the milking on dairy farms; (*c*) by contributing prizes and assistance in milk and milk products shows, thus encouraging meritorious efforts along dairy lines; (*d*) by conducting a grade

heifer contest, thus encouraging the rearing of animals of superior merit among the grades of the several dairy breeds.

The Commonwealth reaps her reward in greater milk consumption and increased number of dairy cows, the former tending to the upbuilding of health and vigor of her people, and the latter to a stimulation of her agriculture and food production.

Regular Bureau Expenses.

Available,		$7,209 44
Bureau compensation,	$235 00	
Bureau expenses,	303 51	
Agents' compensation,	2,717 00	
Agents' expenses,	2,503 31	
Samples purchased,	233 42	
Analysts, analyses,	339 50	
Analysts, court attendance,	190 00	
Printing,	510 21	
Photography and lantern slides,	36 59	
Supplies,	140 48	
		7,209 02
Balance,		$0 42

Encouragement of Practical Dairying Expenses.

Available,		$6,946 69
Printing "Food Value of Milk" and other publications,	$1,141 79	
Cash prizes,	1,753 50	
Prizes, certificates,	149 94	
Lectures,	100 00	
Judges' expenses,	132 81	
Agents' expenses,	983 93	
Agents' compensation,	221 50	
Postage,	50 00	
Supplies,	80 54	
		4,614 01
Balance,		$2,332 68

Respectfully submitted,

P. M. HARWOOD,
General Agent.

FIFTH ANNUAL REPORT

ON

BOYS' AND GIRLS' CLUB WORK.

DECEMBER 19, 1918.

FIFTH ANNUAL REPORT ON BOYS' AND GIRLS' CLUB WORK.

To the State Department of Agriculture.

The following figures will show the enrollment in the eight club projects during the past year: —

Corn,	425	
Potato,	562	
Market garden,	1,085	
Pig,[1]	3,358	
Poultry,	758	
Canning,	3,732	
Home economics,	3,095	
		13,015
Home and school gardens,		109,117
		122,132

The results of the 1918 Home Economics Club show great improvement over 1917. Over one-half of the club members enrolled completed all requirements, and twice as many clubs "came through" as banner clubs as compared with last year.

1917 Contest.

Enrollment,	2,006
Banner clubs,	17
Number completing,	764

1918 Contest.

Enrollment,	2,980
Banner clubs,	34
Number completing,	1,506

The renovating of clothing, Red Cross and war relief work have been featured in the past year, and the girls have heartily responded in taking up this new phase of sewing.

[1] There were over 4,000 pigs distributed to boys and girls in the State, and they were assisted in various ways by the county and State workers. They did not all, however, for one reason or another, join the State club, feeling that they were helping to increase pork production even though they did not keep records and write a story.

As an outgrowth of last year's community canning stations, many new kitchens have been opened this year and managed successfully by club girls. The Harvard Canning and Evaporating Club, consisting of 15 girls, canned over 2,500 quarts of products, dried 100 pounds of apples, and made over 100 tumblers of jelly and marmalade. The total number of quarts canned at these community canning stations was 47,182.

During the year, the junior extension office published 5 bulletins. Approximately 86,600 pieces of follow-up instructions were prepared and sent out to club members from the State office.

As a result of the United States Department of Agriculture emergency funds we have been able to employ 11 club leaders, and through private funds and private subscription have had a club leader in 12 of the 14 counties, the exception being Dukes and Nantucket, where the county agent and home demonstration agent carry on the work in a most satisfactory manner.

Certain pork packers of Massachusetts have made it possible for the junior office to purchase a moving-picture machine, with a film showing Pig Club work in Massachusetts.

The State Board of Agriculture money has been used for prizes, as follows: —

Washington trip.	Books.
Massachusetts Agricultural College camp week.	Banners.
	Pins.
War savings stamps.	State Fair.

For 1919 we anticipate working along much the same lines as in former years. We shall broaden the number of activities to fit certain local conditions which we have found. In one county the club leader is anxious to try a rabbit club. Two local leaders are anxious to develop a calf club. We hope this year to make an active poultry drive, emphasizing particularly early spring hatching. We shall try these new lines only locally, to see if they prove satisfactory before attempting to make them State wide. In fact, as the work develops and we are able to have county workers, it is becoming evident that we shall do better to feature certain activities in certain counties depending upon local conditions.

As I think over the work which has been accomplished during the past year, it seems to me that it may be summarized under four heads: —

First. — Increased food production.

Second. — Financial profit (in the total and to the individual).

Third. — Increased interest in continuing their education on the part of some young people.

Fourth. — Pleasure in accomplishment (individually and in groups). Developing social instincts.

During the past two years rather more emphasis has been put upon the first two of these results, but with the return of normal times, it seems probable that the last two will receive increasingly more attention.

FINANCIAL STATEMENT.

Appropriation (through Department of Agriculture),	$2,000 00
Cash prizes,	192 30
Cups, badges, buttons and ribbons,	531 95
Prize trips,	1,059 80
Books, supplies, etc.,	174 75
Express,	84
Printing,	9 00
Balance,	31 36

Respectfully submitted,

GEORGE L. FARLEY,
Supervisor, Junior Extension Work.

AMHERST, MASSACHUSETTS, December, 1918.

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